ECKAX-5.2

VAX 11/750 CPU
CLUSTER EXERCISER

EP-ECKAX-DL-5.2
1 OF 4 JUL 1986
COPYRIGHT© 1980-86

digital
MADE IN USA

ECKAX-5.2

VAX 11/750 CPU
CLUSTER EXERCISER

EP-ECKAX-DL-5.2
2 OF 4 JUL 1986
COPYRIGHT© 1980-86

digital
MADE IN USA

ECKAX-5.2

VAX 11/750 CPU
CLUSTER EXERCISER

EP-ECKAX-DL-5.2
3 OF 4 JUL 1986
COPYRIGHT© 1980-86

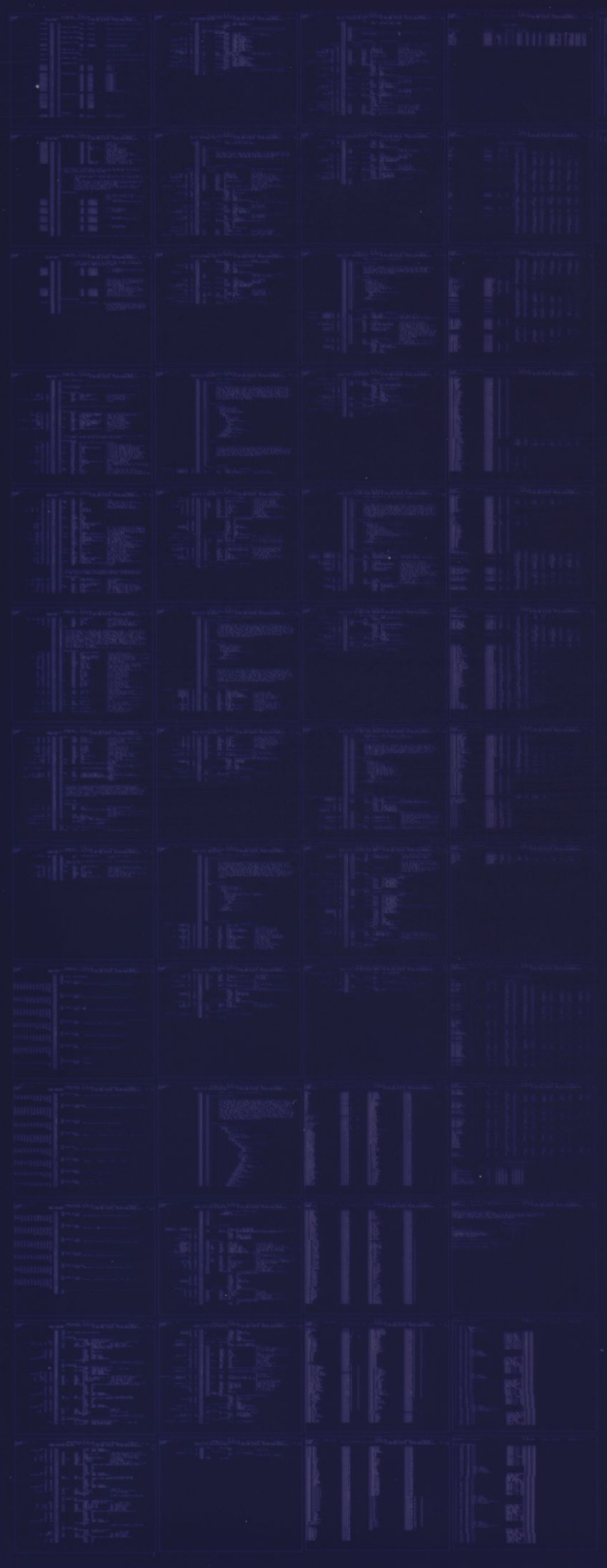
digital
MADE IN USA

ECKAX-5.2

VAX 11/750 CPU
CLUSTER EXERCISER

EP-ECKAX-DL-5.2
4 OF 4 JUL 1986
COPYRIGHT© 1980-86

digital
MADE IN USA



IDENTIFICATION

Product Code: ZZ-ECKAX-5.2

Product Name: ECKAX 11/750 CPU CLUST EXCZR

Product Date: February 1986

Maintainer: Base Systems Diagnostic Engineering

may not be provided or otherwise made available to any other person except for use on such system and to one who agrees to these license terms. Title to and ownership of the software shall at all times remain in DEC.

The information in this software is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation.

DEC assumes no responsibility for the use or reliability of its software on equipment which is not supplied by DEC.

Table of Contents
----- -- --------

1.0 MAINTENANCE HISTORY

2.0 ABSTRACT

3.0 REQUIREMENTS
- 3.1 Hardware Requirements
- 3.2 Software Requirements
- 3.3 Prerequisites

4.0 ASSUMPTIONS

5.0 OPERATING INSTRUCTIONS

6.0 PROGRAM FUNCTIONAL DESCRIPTION

7.0 TEST DESCRIPTIONS
- 7.1 Reserved Processor Registers
- 7.2 Power Fail (init switch)
- 7.3 Power Fail (breaker)
- 7.4 Processor Halts (Arch. Defined)
- 7.5 Processor halts (Arch. Undefined)
- 7.6 WCS Memory
- 7.7 WCS Execution
- 7.8 Machine Check
- 7.9 TU58 Exerciser
- 7.10 TU58 Exerciser Read/Write
- 7.11 TU58 Exerciser (With MRSP)
- 7.12 TU58 Exerciser Read/Write (With MRSP)
- 7.13 PCS Memory Test
- 7.14 PCS Execution Test

8.0 B

1.0 Maintenance History

Rev	Date	Reason
1.0	6 Jun 80	Initial Release
2.0	22 Sep 80	ECKAX7 2.0 - Updated to include TU58 interrupt tests and IPL check. ECKAX5 2.0 - Micro instructions changed in WCS executable tests. ECKAX1 1.1 - FAO directive changed to ASCII code in error message. ECKAX1 1.1 - Header changed to reflect diagnostic revision level.
3.0	22 Oct 80	ECKAX6 2.0 - Control Store parity error subtest added. Bug in READ_GPR subroutine fixed. Loop count changed from 13 to 12. ECKAX7 3.0 - DS$_BREAK added befor all data checks for ^C response within 3 seconds. ECKAX1 1.2 - Header changed to reflect diagnostic revision level.
3.1	10 Nov 80	ECKAX5 2.1 - Debug branch removed from moving inversions subtest and $DS_BREAK added. ECKAX6 2.1 - Check for Cache hit added to WCS error check routine. ECKAX1 1.3 - Header changed to reflect diagnostic revision level. ECKAX1 1.4 - Header changed to reflect diagnostic revision level.
3.2	19 Feb 80	ECKAX3 2.0 - Bug fix for power fail battery backup added. ECKAX6 2.2 - Bug fix for don't care on MC VA in logout. ECKAX1 2.0 - Changed subtest 2 and 3 to be general read only and write only. IPR 3F added to write only and removed from unused list. ECKAX7 3.1 - Changed delay time for read dir subtest to wait longer for tape to rewind.
3.3	20 July 1981	NO CHANGE TO ANY MODULE - Correction to sections 7.2 and 7.3 of this document.

3.4	3 May 1982	ECKAX3 3.4 - Changed exit routine of Test 3 to accomodate temporarily a hardware problem.
4.0	3 Jan 1982	ECKAX 4.0 - Added new test for new PCS/WCS module (tests 13 and 14 Altered tests 5 & 6 for coverage on the enhanced WCS. (1k or 2k)
5.0	3 Mar 1983	ECKAX 5.0 - Added test 5 for coverage of Processor Halts Architecture Undefined.(Subtest in test 5 that need to use invaild SCBB are not in this test,since,a bug in VAX-11/750 MicroCode on handle Invalid SCBB was found.) Added tests 11 and 12 for coverage of new ROM with MRSP of TU58.
5.2	February 1986	Redefined IPR's to jive withthe starlet. Modified code for problem report Eckax5: Tests 5 & 6 test with cache off. Modified code for problem report Eckax6: Subtest 1 doesn't check bit 0 of the memory under test. Subtest 4 tests row 0, 1, 2 but not row 3.

2.0 Program Abstract

This program is a level 3 diagnostic that tests most portions of the VAX 11/750 CPU cluster hardware which are not specified by the VAX architecture. The areas tested by this program are reserved processor registers, power fail, processor halts, WCS, machine checks, and TU58. This program must run in a standalone environment under control of the Diagnostic Supervisor.

3.0 Requirements

3.1 Hardware:

The VAX 11/750 computer system. A WCS module if testing WCS.

3.2 Software:

Diagnostic Supervisor

3.3 Prerequisites:

ZZ-EVKAA VAX Hardcore Instruction Test.

4.0 Assumptions

Memory and the load path are good.

5.0 Operating Instructions

5.1 Loading and Starting

Refer to the "VAX - 11 Diagnostic Systems Users Guide" for instructions on how to load and start the Diagnostic Supervisor and how to load and execute programs under the Diagnostic Supervisor. The operator must attach and select the CPU (KA750) before starting the program. This program will not run with memory management set on by the operator.

5.2 Program size

The program will take 266 pages (136192 bytes) of memory.

5.3 Run time

Average runtime for a fault free pass without executing manual tests is aproximately 10 minutes.

5.4 Section names

The section names are as follows:

DEFAULT
MANUAL
TU58
POWERFAIL
HALT
MCHK
WCS
IPR

5.5 Standard error message

The diagnostic supervisor produces the standard header message which contains the program ID, the test number, the subtest number, the error number (1), the class of error (HARD), the unit under test (KA0), and a program supplied message describing the function executed.

Example:

```
****  VAX 11/750 Specific CPU Cluster Exerciser - ZZ-ECKAX-3.2  ****
 PASS 1  TEST 2  SUBTEST 3  ERROR 1 1-JAN-1981  00:07:13.42
 HARD ERROR WHILE TESTING KA0:     Description of failure
```

6.0 Program Functional Description

7.0 Test Descriptions

7.1 ECKAX1: RESERVED PROCESSOR REGISTERS

This test will verify that all internal processor register addresses not implemented on the VAX-11/750 will cause a reseved operand fault for a MTPR or MFPR instruction. Internal processor registers specific to the VAX-11/750 are checked to not cause reserved operand faults depending if they are read-write, read only, or write only. This tests does not check each bit in each individual register.

7.2 ECKAX3: POWER FAIL (INIT SWITCH)

This test checks the VAX-11/750 power failure and recovery mechanism. For this test to function properly the right front panel select switch must be in the HALT/RESTART position. This test consists of a series of manual operator intervention subtests. These subtests will check that the Restart Parameter Block (RPB) is recognizable and is able to recover properly in the event of a power failure. The power failure induced by pushing the initialize switch on the front panel of the 11/750. This simulates a power fail without removing all power from the system. When this test is complete the operator will be prompted to execute the next test using the breaker switch on the bus if it is equipped with a battery backup. If a negative response is received the test is exited and the power fail test is complete. Before entering a negative responce the front panel switch must be set in the HALT position for the halt test to function properly.

7.3 ECKAX3: POWER FAIL (BREAKER)

This test consists of a series of manual operator intervention subtests. These subtests are the same as in the Power Fail (init) test but instead of pushing the init switch to simulate the power failure, the breaker at the bus of the 11-750 is thrown causing a power failure. Attempts to simulate system power failure using either the front panel key or the processor circuit breaker on the back panel removes the filtering action on switching transients by the line filter and the normal power-fail sequence may be defeated. For this test to function properly the right front panel select switch must be in the HALT/RESTART position.The operator is asked if the system under test is equipped with a battery backup. If a negative response is received the test is exited and the power fail test is complete. Before entering a negative responce the front panel switch must be in the HALT position for the other tests to function properly.

7.4 ECKAX4: PROCESSOR HALT (ARCH. DEFINED)

This test checks the various ways the VAX-11/750 processor can be halted in an architecturally defined manner. This includes executing a HALT instruction in kernel mode, attempting certain references to an invalid interrupt stack and executing change mode instructions when the IS bit of the PSL is set.

7.5 ECKAX4: PROCESSOR HALTS (ARCH.UNDEFINED)

This module checks the various ways the VAX-11/750 processor can be halted in an ARCHITECTURALLY UNDEFINED manner. These ways includes a change mode instruction with vertor service on IS and invalid vector Halt.

7.6 ECKAX5: WRITABLE CONTROL STORE

This test checks that the WCS module, if present, may be loaded as a memory and also may be executed from. WCS tested as a memory consists of data path, row select, address path and moving inversions.

7.7 ECKAX5: WRITABLE CONTROL STORE EXECUTION

The executable test consists of an entry/exit subtest, next field addressing, and an execution data path subtest.

7.8 ECKAX6: MACHINE CHECK EXCEPTIONS AND INTERRUPTS

This test checks that a reference to non-existent memory will cause a machine check exception while attempting to read and an interrupt attempting to write. A Control Store parity error machine check is also forced.

7.9 ECKAX7: TU58 EXERCISER

This test exercises the TU58 on the VAX-11/750 by performing initialization, self diagnostic and no operation. All information received from the TU58 is checked for errors. This subtest does not write or read the TU58. All operations performed deal with the controller only.

7.10 ECKAX7: TU58 EXERCISER READ/WRITE

This test exercises the TU58 on the VAX-11/750 by performing position, read (normal - flag-driven and interrupt-modes - and two versions of modified) and write (normal - flag- and interrupt-driven modes - and two versions of modified) commands. Zero padding of blocks and records are also checked for write commands. All packets are checked for errors. Timers are setup to time out if a byte transaction between the host and TU58 is not completed within a reasonable amount of time. If any errors are detected, they are reported. This test assumes the scratch tape cartridge used is in good condition. If a marginal tape is used bits may be dropped during the read modified test which reads with an increased threshold and will consequently report false data errors. Any tape may be used, but existing data will be destroyed. Before the tape is written, the first directory will be read. If the directory read is not "scrat .ch", the operator will be prompted to either overwrite the tape or abort this test. If overwriting the tape is chosen, an attempt to write "scrat .ch" in the first directory area will be made. If an operational error occurs it will be reported, but error detection in this subtest is limited and the primary function is to give the operator an opportunity to remove a tape containing valuable data from the drive and inserting a scratch tape before it is destroyed. An IPL check is included to check that the TU58 will not interrupt the CPU unless the IPL is 16 or lower. No data is checked in the IPL check subtest.

7.11 ECKAX7: TU58 EXERCISER (With MRSP)

This test exercises the TU58 (With MRSP) on the VAX-11/750 by performing initialization, self diagnostic and no operation. All information received from the TU58 is checked for errors. All errors detected are reported. This test does not write or read the TU58. All operations performed deal with the controller only.

7.12 ECKAX7: TU58 EXERCISER READ/WRITE (With MRSP)

This test exercises the TU58 on the VAX-11/750 by performing position, read (normal - flag-driven and interrupt-modes - and two versions of modified) and write (normal - flag- and interrupt-driven modes - and two versions of modified) commands. Zero padding of blocks and records are also checked for write commands. All packets are checked for errors. Timers are setup to time out if a byte transaction between the host and TU58 is not completed within a reasonable amount of time. If any errors are detected, they are reported. This test assumes the scratch tape cartridge used is in good condition. If a marginal tape is used bits may be dropped during the read modified test which reads with an increased threshold and will consequently report false data errors. Any tape may be used, but existing data will be destroyed. Before the tape is written, the first directory will be read. If the directory read is not "scrat .ch", the operator will be prompted to either overwrite the tape or abort this test. If overwriting the tape is chosen, an attempt to write "scrat .ch" in the first directory area will be made. If an operational error occurs it will be reported, but error detection in this subtest is limited and the primary function is to give the operator an opportunity to remove a tape containing valuable data from the drive and inserting a scratch tape before it is destroyed. An IPL check is included to check that the TU58 will not interrupt the CPU unless the IPL is 16 or lower. No data is checked in the IPL check subtest.

7.13 ECKAX8: PCS Memory Test

7.14 ECKAX8: PCS Execution Test

8.0 Bibliography

8.1 VAX - 11 Diagnostic Systems User Guide

Object Module Synopsis

Module Name	Ident	Bytes	File	Creation Date	Creator
ECKAX1	5.2	1386	[TAYLOR.ECKAX]ECKAX1.OBJ;1	3-MAR-1986 09:45	VAX/VMS Macro V04-00
ECKAX2	5.2	1742	[TAYLOR.ECKAX]ECKAX2.OBJ;1	25-FEB-1986 09:36	VAX/VMS Macro V04-00
ECKAX3	5.2	4447	[TAYLOR.ECKAX]ECKAX3.OBJ;1	25-FEB-1986 13:14	VAX/VMS Macro V04-00
ECKAX4	5.2	8488	[TAYLOR.ECKAX]ECKAX4.OBJ;1	25-FEB-1986 13:15	VAX/VMS Macro V04-00
ECKAX5	5.2	4046	[TAYLOR.ECKAX]ECKAX5.OBJ;1	21-FEB-1986 09:49	VAX/VMS Macro V04-00
ECKAX6	5.2	3671	[TAYLOR.ECKAX]ECKAX6.OBJ;1	21-FEB-1986 09:50	VAX/VMS Macro V04-00
ECKAX7	5.2	28541	[TAYLOR.ECKAX]ECKAX7.OBJ;1	21-FEB-1986 09:51	VAX/VMS Macro V04-00
ECKAX8	5.2	4548	[TAYLOR.ECKAX]ECKAX8.OBJ;1	21-FEB-1986 10:05	VAX/VMS Macro V04-00

Program Section Synopsis

Psect Name	Module Name	Base	End	Length	Align	Attributes
$HEADER		00000200	00000291	00000092 (146.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR,NOEXE, RD,NOWRT,NOVEC
	ECKAX1	00000200	00000291	00000092 (146.)	PAGE 9	
$TSTCNT		00000294	00000297	00000004 (4.)	LONG 2	NOPIC,USR,OVR,REL,LCL,NOSHR,NOEXE, RD,NOWRT,NOVEC
	ECKAX2	00000294	00000297	00000004 (4.)	LONG 2	
	ECKAX3	00000294	00000297	00000004 (4.)	LONG 2	
	ECKAX4	00000294	00000297	00000004 (4.)	LONG 2	
	ECKAX5	00000294	00000297	00000004 (4.)	LONG 2	
	ECKAX6	00000294	00000297	00000004 (4.)	LONG 2	
	ECKAX7	00000294	00000297	00000004 (4.)	LONG 2	
	ECKAX8	00000294	00000297	00000004 (4.)	LONG 2	
ARGLIST		00000298	0000060F	00000378 (888.)	LONG 2	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX2	00000298	000002C7	00000030 (48.)	LONG 2	
	ECKAX3	000002C8	00000327	00000060 (96.)	LONG 2	
	ECKAX4	00000328	000003B7	00000090 (144.)	LONG 2	
	ECKAX5	000003B8	000003FF	00000048 (72.)	LONG 2	
	ECKAX6	00000400	00000423	00000024 (36.)	LONG 2	
	ECKAX7	00000424	000005BB	00000198 (408.)	LONG 2	
	ECKAX8	000005BC	0000060F	00000054 (84.)	LONG 2	
CLEANUP		00000610	000006F5	000000E6 (230.)	LONG 2	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD, WRT,NOVEC
	ECKAX1	00000610	000006F5	000000E6 (230.)	LONG 2	
DATA		00000800	0000099C	0000019D (413.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD, WRT,NOVEC
	ECKAX1	00000800	0000099C	0000019D (413.)	PAGE 9	
DISPATCH		000009A0	00000AEF	00000150 (336.)	LONG 2	NOPIC,USR,CON,REL,LCL,NOSHR,NOEXE, RD,NOWRT,NOVEC
	ECKAX2	000009A0	000009B7	00000018 (24.)	LONG 2	
	ECKAX3	000009B8	000009E7	00000030 (48.)	LONG 2	
	ECKAX4	000009E8	00000A17	00000030 (48.)	LONG 2	
	ECKAX5	00000A18	00000A47	00000030 (48.)	LONG 2	
	ECKAX6	00000A48	00000A5F	00000018 (24.)	LONG 2	
	ECKAX7	00000A60	00000ABF	00000060 (96.)	LONG 2	
	ECKAX8	00000AC0	00000AEF	00000030 (48.)	LONG 2	
DISPATCH_X		00000AF0	00000B07	00000018 (24.)	LONG 2	NOPIC,USR,CON,REL,LCL,NOSHR,NOEXE, RD,NOWRT,NOVEC
	ECKAX1	00000AF0	00000B07	00000018 (24.)	LONG 2	

Psect Name	Module Name	Base	End	Length	Align	Attributes
ECKAX1		00000C00	00000D45	00000146 (326.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX1	00000C00	00000D45	00000146 (326.)	PAGE 9	
ECKAXA		00000E00	00001134	00000335 (821.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX2	00000E00	00001134	00000335 (821.)	PAGE 9	
ECKAXC		00001200	00001D52	00000B53 (2899.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX3	00001200	00001D52	00000B53 (2899.)	PAGE 9	
ECKAXD		00001D54	00002B60	00000E0D (3597.)	LONG 2	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD, WRT,NOVEC
	ECKAX4	00001D54	00002B60	00000E0D (3597.)	LONG 2	
ECKAXE		00002C00	000035E4	000009E5 (2533.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX5	00002C00	000035E4	000009E5 (2533.)	PAGE 9	
ECKAXF		00003600	00004103	00000B04 (2820.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX6	00003600	00004103	00000B04 (2820.)	PAGE 9	
ECKAXG		00004200	0000644C	0000224D (8781.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX7	00004200	0000644C	0000224D (8781.)	PAGE 9	
ECKAXH		00006600	00006FDE	000009DF (2527.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX8	00006600	00006FDE	000009DF (2527.)	PAGE 9	
INITIALIZE		00006FE0	00007088	000000A9 (169.)	LONG 2	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD, WRT,NOVEC
	ECKAX1	00006FE0	00007088	000000A9 (169.)	LONG 2	
SUMMARY		0000708C	000070D9	0000004E (78.)	LONG 2	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD, WRT,NOVEC
	ECKAX1	0000708C	000070D9	0000004E (78.)	LONG 2	
TEST_001		00007200	0000754C	0000034D (845.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX2	00007200	0000754C	0000034D (845.)	PAGE 9	
TEST_002		00007600	000078AC	000002AD (685.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX3	00007600	000078AC	000002AD (685.)	PAGE 9	
TEST_003		00007A00	00007CCA	000002CB (715.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX3	00007A00	00007CCA	000002CB (715.)	PAGE 9	
TEST_004		00007E00	000089BF	00000BC0 (3008.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX4	00007E00	000089BF	00000BC0 (3008.)	PAGE 9	
TEST_005		00008A00	00009096	00000697 (1687.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX4	00008A00	00009096	00000697 (1687.)	PAGE 9	
TEST_006		00009200	000095CE	000003CF (975.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX5	00009200	000095CE	000003CF (975.)	PAGE 9	
TEST_007		00009600	0000979D	0000019E (414.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX5	00009600	0000979D	0000019E (414.)	PAGE 9	
TEST_008		00009800	00009B12	00000313 (787.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX6	00009800	00009B12	00000313 (787.)	PAGE 9	
TEST_009		00009C00	0000A049	0000044A (1098.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX7	00009C00	0000A049	0000044A (1098.)	PAGE 9	
TEST_010		0000A200	0000C341	00002142 (8514.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX7	0000A200	0000C341	00002142 (8514.)	PAGE 9	
TEST_011		0000C400	0000C855	00000456 (1110.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX7	0000C400	0000C855	00000456 (1110.)	PAGE 9	
TEST_012		0000CA00	0000EB51	00002152 (8530.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX7	0000CA00	0000EB51	00002152 (8530.)	PAGE 9	
TEST_013		0000EC00	0000F02C	0000042D (1069.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX8	0000EC00	0000F02C	0000042D (1069.)	PAGE 9	
TEST_014		0000F200	0000F52F	00000330 (816.)	PAGE 9	NOPIC,USR,CON,REL,LCL,NOSHR, EXE, RD,NOWRT,NOVEC
	ECKAX8	0000F200	0000F52F	00000330 (816.)	PAGE 9	

! Symbols By Name !

Symbol	Value	Symbol	Value	Symbol	Value
$ENV	00000001	KA$W_LATENCY	0000003E	T10_S4	0000A991-R
$MO	00000001	KA$W_MEM_SIZE	00000044	T10_S5	0000AB80-R
ALL	00000009	KA$W_PROGRESS	00000040	T10_S6	0000ACE1-R
A_BUFFER_BEGIN	00000C00-R	KA$W_RESERVED	00000038	T10_S7	0000AEC6-R
A_BUFFER_END	00000C04-R	KA$W_WCS	00000036	T10_S8	0000B019-R
A_HALT_BUFFER	00000C10-R	KA_PTABLE	00000D42-R	T10_S9	0000B391-R
A_MCHK_BUFFER	00000C18-R	L_ACT_ISP	00000C38-R	T11_S1	0000C535-R
A_PSLMNE	00000CCC-R	L_ACT_KSP	00000C34-R	T11_S2	0000C638-R
A_PWR_BUFFER	00000C08-R	L_ACT_PSL	00000C3C-R	T11_S3	0000C73B-R
A_WCS_BUFFER	00000C20-R	L_ACT_SP	00000C30-R	T12_S1	0000CB3D-R
DEFAULT	00000000	L_EXP_AP	00000C78-R	T12_S10	0000DEE4-R
ERROR_CHECK	00002A39-R	L_EXP_FP	00000C7C-R	T12_S11	0000E26B-R
GPR_TABLE	00000C48-R	L_EXP_ISP	00000C88-R	T12_S12	0000E5C8-R
HALT	00000004	L_EXP_KSP	00000C84-R	T12_S13	0000E802-R
HARDCNT	00000800-R	L_EXP_PSL	00000C8C-R	T12_S14	0000E99A-R
IPR	00000006	L_EXP_SP	00000C80-R	T12_S2	0000CE4D-R
KA$B_ACC_TYPE	00000042	L_ISP	00000C44-R	T12_S3	0000D03C-R
KA$B_NODE_ID	00000046	L_KSP	00000C40-R	T12_S4	0000D19D-R
KA$B_RESERVED	00000043	L_REV_CHECK	00000C90-R	T12_S5	0000D38C-R
KA$B_SID_TYPE	0000003D	MANUAL	00000001	T12_S6	0000D4ED-R
KA$K_LEN	0000004B	MCHK	00000005	T12_S7	0000D6D2-R
KA$L_FLAGS	00000032	MODELIST	00000D0D-R	T12_S8	0000D825-R
KA$L_MEM_SIZE	00000047	PART_INIT	00000963-R	T12_S9	0000DB9D-R
KA$L_SID	0000003A	PCS	00000008	T13_S1	0000ECDF-R
KA$M_CHAR	00000100	PCS$A_PCS_BUFFER	00000C28-R	T13_S2	0000ED82-R
KA$M_CRC	00000010	POWER_FAIL	00000003	T13_S3	0000EE20-R
KA$M_D_FLOAT	00000002	REG_TABLE	00000C94-R	T13_S4	0000EEBE-R
KA$M_EDIT	00000080	SPACE1	000008CF-R	T14_S1	0000F2EB-R
KA$M_F_FLOAT	00000001	SPACE10	00000905-R	T14_S2	0000F38E-R
KA$M_G_FLOAT	00000004	SPACE2	000008D1-R	T14_S3	0000F43A-R
KA$M_H_FLOAT	00000008	SPACE3	000008D4-R	T1_S1	00007226-R
KA$M_PACKED	00000020	SPACE4	000008D8-R	T1_S2	000072F6-R
KA$M_PACK_MUL	00000040	SPACE5	000008DD-R	T1_S3	000073AE-R
KA$M_SB_ERR	02000000	SPACE6	000008E3-R	T1_S4	00007485-R
KA$M_TODR	00010000	SPACE7	000008EA-R	T2_S1	00007666-R
KA$M_WCS_LD	01000000	SPACE8	000008F2-R	T2_S2	000076E4-R
KA$V_CHAR	00000008	SPACE9	000008FB-R	T2_S3	00007770-R
KA$V_CRC	00000004	SYS$ASCTIM	00010248	T2_S4	0000780F-R
KA$V_D_FLOAT	00000001	SYS$GETTIM	00010378	T3_S1	00007A6D-R
KA$V_EDIT	00000007	SYS$SETPRT	00010430	T3_S2	00007AEB-R
KA$V_F_FLOAT	00000000	T10_S1	0000A331-R	T3_S3	00007B77-R
KA$V_G_FLOAT	00000002	T10_S10	0000B6D8-R	T3_S4	00007C16-R
KA$V_H_FLOAT	00000003	T10_S11	0000BA5F-R	T4_S1	00007E88-R
KA$V_PACKED	00000005	T10_S12	0000BDBC-R	T4_S2	00007FAB-R
KA$V_PACK_MUL	00000006	T10_S13	0000BFF6-R	T4_S3	00008219-R
KA$V_SB_ERR	00000019	T10_S14	0000C191-R	T4_S4	000083A5-R
KA$V_TODR	00000010	T10_S2	0000A641-R	T4_S5	00008528-R
KA$V_WCS_LD	00000018	T10_S3	0000A830-R	T4_S6	000086A8-R

Symbol	Value	Symbol	Value	Symbol	Value
T4_S7	00008828-R				
T5_S1	00008A80-R				
T5_S2	00008BB2-R				
T5_S3	00008CE4-R				
T5_S4	00008E16-R				
T5_S5	00008F6C-R				
T6_S1	00009294-R				
T6_S2	0000932B-R				
T6_S3	000093BD-R				
T6_S4	00009453-R				
T7_S1	0000967A-R				
T7_S2	000096F9-R				
T8_S1	00009847-R				
T8_S2	00009926-R				
T8_S3	00009A1B-R				
T9_S1	00009D29-R				
T9_S2	00009E2C-R				
T9_S3	00009F2F-R				
TEST_001	00007224-R				
TEST_001_X	00007545-R				
TEST_002	00007624-R				
TEST_002_X	000078A5-R				
TEST_003	00007A20-R				
TEST_003_X	00007CB9-R				
TEST_004	00007E30-R				
TEST_004_X	000089B8-R				
TEST_005	00008A28-R				
TEST_005_X	0000908F-R				
TEST_006	00009218-R				
TEST_006_X	000095C7-R				
TEST_007	0000961C-R				
TEST_007_X	00009796-R				
TEST_008	00009830-R				
TEST_008_X	00009B0B-R				
TEST_009	00009C18-R				
TEST_009_X	0000A042-R				
TEST_010	0000A220-R				
TEST_010_X	0000C33A-R				
TEST_011	0000C424-R				
TEST_011_X	0000C84E-R				
TEST_012	0000CA2C-R				
TEST_012_X	0000EB4A-R				
TEST_013	0000EC18-R				
TEST_013_X	0000F025-R				
TEST_014	0000F21C-R				
TEST_014_X	0000F528-R				
TU58	00000002				
WCS	00000007				

Symbol	Value	Symbol	Value	Symbol	Value

Key for special characters above:

*	- Undefined
U	- Universal
R	- Relocatable
X	- External
V	- Vectored

Image Synopsis

```
Virtual memory allocated:                    00000200 0000F5FF 0000F400 (62464. bytes, 122. pages)
Stack size:                                         0. pages
Image binary virtual block limits:                  1.      122. (  122. blocks)
Image name and identification:               ECKAX 5.2
Number of files:                                   10.
Number of modules:                                  9.
Number of program sections:                        34.
Number of global symbols:                         210.
Number of image sections:                           1.
Image type:                                  SYSTEM.
Map format:                                  DEFAULT in file DISK$DIAGPACK02:[TAYLOR.ECKAX]ECKAX.MAP;3
Estimated map length:                        56. blocks
```

Link Run Statistics

Performance Indicators	Page Faults	CPU Time	Elapsed Time
Command processing:	108	00:00:00.67	00:00:01.84
Pass 1:	303	00:00:01.25	00:00:04.64
Allocation/Relocation:	22	00:00:00.14	00:00:00.65
Pass 2:	174	00:00:02.77	00:00:07.22
Map data after object module synopsis:	6	00:00:00.53	00:00:00.62
Symbol table output:	0	00:00:00.02	00:00:00.10
Total run values:	613	00:00:05.38	00:00:15.07

```
Using a working set limited to 1862 pages and 59 pages of data storage (excluding image)

Total number object records read (both passes):   722
    of which 14 were in libraries and 16 were DEBUG data records containing 1215 bytes

Number of modules extracted explicitly              = 0
    with 1 extracted to resolve undefined symbols

0 library searches were for symbols not in the library searched

A total of 0 global symbol table records was written

LINK/CONTIG/SYST=%X200/EXE=ECKAX/MAP=ECKAX ECKAX1+ECKAX2+ECKAX3+ECKAX4+ECKAX5+ECKAX6+ECKAX7+ECKAX8
```

Table of contents

(1)	1	ECKAX1: HEADER MODULE
(2)	62	DECLARATIONS
(3)	171	Program Header Data Block
(3)	185	Dispatch Table
(3)	198	Hardware Parameter Table
(4)	212	Program Global Data Section
(5)	259	Program Text Section
(6)	324	Initialization Procedure
(8)	375	Clean-up Procedure
(9)	442	Summary Report Procedure
(11)	515	Summary Information Block Initialization Subroutine
(13)	568	Summary Information Input Subroutine

```
0000     1          .SBTTL  ECKAX1: HEADER MODULE
0000     2          .TITLE  ECKAX1  VAX 11/750 Specific CPU Cluster Exerciser
0000     3          .IDENT  /5.2/
0000     4
0000     5 ;
0000     6 ; Copyright (C) 1980,1983,1986
0000     7 ; Digital Equipment Corporation, Maynard, Massachusetts 01754
0000     8 ;
0000     9 ; This software is furnished  under a license for use only on a single
0000    10 ; computer  system and  may be  copied only with  the inclusion of the
0000    11 ; above copyright notice.  This software, or any other copies thereof,
0000    12 ; may not be provided or  otherwise made available to any other person
0000    13 ; except for use on such system and to one who agrees to these license
0000    14 ; terms.  Title to and  ownership of the  software  shall at all times
0000    15 ; remain in DEC.
0000    16 ;
0000    17 ; The information in this software is subject to change without notice
0000    18 ; and should  not be construed  as a commitment  by Digital  Equipment
0000    19 ; Corporation.
0000    20 ;
0000    21 ; DEC assumes  no  responsibility  for  the use or  reliability of its
0000    22 ; software on equipment which is not supplied by DEC.
0000    23 ;
0000    24
0000    25 ;++
0000    26 ; Facility:     VAX Architecture Diagnostic.
0000    27 ;
0000    28 ; Abstract:     This module provides all the standard header informaton
0000    29 ;               and routines required to interface to the VAX Diagnostic
0000    30 ;               Supervisor.
0000    31 ;
0000    32 ; Environment:  VAX Diagnostic Supervisor.
0000    33 ;
0000    34 ; Author:       Fred Roemer     19-FEB-81       Version 1.4
0000    35 ;
0000    36 ;       NO CHANGES TO ANY MODULE VERSION 1.5 (DOCUMENT CHANGE ONLY)
0000    37 ;
0000    38 ;
0000    39 ;       Dan Milleville  19-Mar-82               Version 3.4
0000    40 ;       Changed Test 3 exit code to accomodate temporarily a hardware problem.
0000    41 ;
0000    42 ;       Dave Shull      30-Nov-82               Version 4.0
0000    43 ;       Added tests 13 and 14 for coverage of PCS module.
0000    44 ;
0000    45 ;       Tai-Chun Pan    04-Mar-83               Version 5.0
0000    46 ;       Added test 5 for coverage of Processor Halts Architecture Undefined.
0000    47 ;       Added tests 11 and 12 for coverage of new ROM with MRSP of TU58.
0000    48 ;
0000    49 ;       Dan Milleville  21-Nov-83               Version 5.1
0000    50 ;       Fixed error in timer routine (didn't turn off timer).
0000    51 ;
0000    52 ;       Wayne R. Taylor February 1986           Version 5.2
0000    53 ;       Redefine the IPR's to jive with starlet.
0000    54 ;       Modified the code for problem report Eckax5 where:
0000    55 ;               Tests 6 & 13 tests with cache off.
```

```
0000     56 ;                  Subtest 1 does not check bit 0 of the memory under test.
0000     57 ;                  Subtest 4 tests row 0, 1, 2, but not row 3.
0000     58 ;          Modifications were supplied by the submitter.
0000     59 ;          Search on 5.2.
0000     60 ;--
```

```
                        0000     62          .SBTTL  DECLARATIONS
                        0000     63          .LIST   MEB
                        0000     64          .NLIST  CND
                    00000000     65          .PSECT  ECKAX1, PAGE, NOWRT
                        0000     66          .LIBRARY        "SYS$LIBRARY:DIAG"; VAX family diagnostic library
                        0000     67          $DS_BGNMOD      CEP_REPAIR
                        0000        ;;;      Macro-32 Diagnostic macro library Version 8.3 "DIAG.MLB (245)"
                        0000     68
                        0000     69 ;
                        0000     70 ; Include files:
                        0000     71 ;
                        0000     72          .LIBRARY        "ECKAX"         ; CPU Cluster Exerciser library.
                        0000     73
                        0000     77          $PR750DEF       ; 5.2
                        0000     78          $DS_SCBDEF
                        0000     79          $DS_DSDEF
                        0000     80          $DS_DSSDEF
                        0000     81          $DS_DSADEF
                        0000     82          $DS_PARDEF
                        0000     83          $DS_PSLDEF
                        0000     84          $PRDEF
                        0000     85          $DS_HPODEF
                        0000     86          KA_DEF
                        0000     87
                        0000     88 ;
                        0000     89 ; Own storage and equated symbols:
                        0000     90 ;
                    00000004    0000     92 A_BUFFER_BEGIN::        .BLKL   1       ; address of data buffer
                    00000008    0004     93 A_BUFFER_END::          .BLKL   1
                    00000010    0008     94 A_PWR_BUFFER::          .BLKL   2       ; address of POWER FAIL data buffer
                    00000018    0010     95 A_HALT_BUFFER::         .BLKL   2       ; address of HALTS data buffer
                    00000020    0018     96 A_MCHK_BUFFER::         .BLKL   2       ; address of MACHINE CHECK data buffer
                    00000028    0020     97 A_WCS_BUFFER::          .BLKL   2       ; address of WCS data buffer
                    00000030    0028     98 PCS$A_PCS_BUFFER::      .BLKL   2       ; address of PCS data buffer
                                0030     99
                    00000034    0030    100 L_ACT_SP::              .BLKL           ; used to store actual SP
                    00000038    0034    101 L_ACT_KSP::             .BLKL           ; used to store actual KSP
                    0000003C    0038    102 L_ACT_ISP::             .BLKL           ; used to store actual ISP
                    00000040    003C    103 L_ACT_PSL::             .BLKL           ; used to store actual PSL
                    00000044    0040    104 L_KSP::                 .BLKL           ; used to store initial KSP
                    00000048    0044    105 L_ISP::                 .BLKL           ; used to store initial ISP
                                0048    106
                                0048    107 GPR_TABLE::
                    00000000    0048    108             .LONG   ^X00000000          ; data for register 0
                    11111111    004C    109             .LONG   ^X11111111          ; data for register 1
                    22222222    0050    110             .LONG   ^X22222222          ; data for register 2
                    33333333    0054    111             .LONG   ^X33333333          ; data for register 3
                    44444444    0058    112             .LONG   ^X44444444          ; data for register 4
                    55555555    005C    113             .LONG   ^X55555555          ; data for register 5
                    66666666    0060    114             .LONG   ^X66666666          ; data for register 6
                    77777777    0064    115             .LONG   ^X77777777          ; data for register 7
                    88888888    0068    116             .LONG   ^X88888888          ; data for register 8
                    99999999    006C    117             .LONG   ^X99999999          ; data for register 9
                    AAAAAAAA    0070    118             .LONG   ^XAAAAAAAA          ; data for register A
```

```
                BBBBBBBB  0074   119          .LONG   ^XBBBBBBBB              ; data for register B
                0000007C  0078   120 L_EXP_AP::      .BLKL                   ; location to store argument counter
                00000080  007C   121 L_EXP_FP::      .BLKL                   ; location to store frame pointer
                00000084  0080   122 L_EXP_SP::      .BLKL                   ; location to store expected SP
                00000088  0084   123 L_EXP_KSP::     .BLKL                   ; location to store expected KSP
                0000008C  0088   124 L_EXP_ISP::     .BLKL                   ; location to store expected ISP
                00000090  008C   125 L_EXP_PSL::     .BLKL                   ; location to store expected PSL
                          0090   126
                0000005E  0090   127 L_REV_CHECK::   .LONG   ^X5E     ; This represents the revision of microcode
                          0094   128                                  ; before the PCS/WCS module (L0008) replaced
                          0094   129                                  ; the L0005 module
                          0094   130
                          0094   131
                          0094   132 REG_TABLE::
            20 30 52 00'  0094   133          .ASCIC  "R0 "
                      03  0094
            20 31 52 00'  0098   134          .ASCIC  "R1 "
                      03  0098
            20 32 52 00'  009C   135          .ASCIC  "R2 "
                      03  009C
            20 33 52 00'  00A0   136          .ASCIC  "R3 "
                      03  00A0
            20 34 52 00'  00A4   137          .ASCIC  "R4 "
                      03  00A4
            20 35 52 00'  00A8   138          .ASCIC  "R5 "
                      03  00A8
            20 36 52 00'  00AC   139          .ASCIC  "R6 "
                      03  00AC
            20 37 52 00'  00B0   140          .ASCIC  "R7 "
                      03  00B0
            20 38 52 00'  00B4   141          .ASCIC  "R8 "
                      03  00B4
            20 39 52 00'  00B8   142          .ASCIC  "R9 "
                      03  00B8
            30 31 52 00'  00BC   143          .ASCIC  "R10"
                      03  00BC
            31 31 52 00'  00C0   144          .ASCIC  "R11"
                      03  00C0
            20 50 41 00'  00C4   145          .ASCIC  "AP "
                      03  00C4
            20 50 46 00'  00C8   146          .ASCIC  "FP "
                      03  00C8
                          00CC   147
                          00CC   148
                          00CC   149 ; The following is used to intrepret the PSL and to print out an English
                          00CC   150 ; language description of its contents.
                          00CC   151
                          00CC   152 A_PSLMNE::
44 50 46 2C 2C 2C 50 54 2C 4D 43 00'  00CC   153          .ASCIC  "CM,TP,,,FPD,IS,CUR=2a,PRV=2a,,"-
50 2C 40 32 3D 52 55 43 2C 53 49 2C   00D8
35 3D 4C 50 49 2C 2C 40 32 3D 56 52   00E4
44 2C 2C 2C 2C 2C 2C 2C 2C 2C 58 5E   00F0
2C 4E 2C 54 2C 56 49 2C 55 46 2C 56   00FC
                  43 2C 56 2C 5A      0108
                              40      00CC
```

```
                                 010D   154                    "IPL=5^X.........DV,FU,IV,T,N,Z,V,C"
                                 010D   155
                        00000004 010D   156 MODELIST::        .LONG   4
                        00000121' 0111  157                  .ADDRESS        AKM
                        00000128' 0115  158                  .ADDRESS        AEM
                        00000132' 0119  159                  .ADDRESS        ASM
                        0000013D' 011D  160                  .ADDRESS        AUM
                                 0121   161
              4C 45 4E 52 45 4B 00' 0121   162 AKM:      .ASCIC  "KERNEL"
                                 06  0121
     45 56 49 54 55 43 45 58 45 00' 0128   163 AEM:      .ASCIC  "EXECUTIVE"
                                 09  0128
  52 4F 53 49 56 52 45 50 55 53 00' 0132   164 ASM:      .ASCIC  "SUPERVISOR"
                                 0A  0132
                    52 45 53 55 00' 013D   165 AUM:      .ASCIC  "USER"
                                 04  013D
                                 0142   166
```

```
                                0142   171          .SBTTL  Program Header Data Block
                                0142   172 ;++
                                0142   173 ; Functional Description:
                                0142   174 ;
                                0142   175 ;       The program header data block contains the parameters which
                                0142   176 ;       allow the Diagnostic Supervisor to control the program.
                                0142   177 ;       The Diagnostic Supervisor looks for the header information
                                0142   178 ;       beginning at virtual address 200(hex).
                                0142   179 ;
                                0142   180 ;--
                                0142   181          $DS_HEADER  <VAX 11/750 Specific CPU Cluster Exerciser - ZZ-ECKAX-5.2 >, -
                                0142   182                      REV = 5, UPDATE = 2, -
                                0142   183                      NUNIT = 1
                                0142                    .SAVE
                            00000000                    .PSECT  $HEADER, PAGE, NOEXE, NOWRT
                    00000058' 0000      L$L_HEADLENGTH: .LONG    A_HEADEND-.    ; LENGTH OF THE HEADER DATA BLOCK
                    00000005  0004      L$L_ENVIRON:    .LONG    <ENV$_SUPER@ENV$V_SUPER>+$ENV  ; PROGRAM ENVIRONMENT
                    00000058' 0008      L$A_NAME:       .ADDRESS T_NAME         ; PROGRAM NAME TEXT ADDRESS
                    00000005  000C      L$L_REV:        .LONG    5              ; PROGRAM REVISION LEVEL
                    00000002  0010      L$L_UPDATE:     .LONG    2              ; DIAGNOSTIC ENGINEERING PATCH ORDER
                    00000000' 0014      L$A_LASTAD:     .ADDRESS LASTAD         ; FIRST FREE LOCATION AFTER PROGRAM
                    00000000' 0018      L$A_DTP:        .ADDRESS DISPATCH       ; TEST DISPATCH TABLE POINTER
                    00000084' 001C      L$A_DEVP:       .ADDRESS AL_DEVTYP      ; DEVICE TYPE LIST POINTER
                    00000001  0020      L$L_UNIT:       .LONG    1              ; NUMBER OF UNITS THAT CAN BE TESTED
                    00000000' 0024      L$A_DREG:       .ADDRESS DEV_REG        ; DEVICE REGISTER CONTENTS TABLE POINTER
                    0000001C  0028                      .LONG    28             ; Ptable length for 4.05 compatability
00000000'00000000'00000000'00000000'  002C              .LONG    0[4]           ; UNUSED OFFSETS
                    00000000' 003C      L$A_ICP:        .ADDRESS INITIALIZE     ; INITIALIZATION CODE POINTER
                    00000000' 0040      L$A_CCP:        .ADDRESS CLEAN_UP       ; CLEAN-UP CODE POINTER
                    00000000' 0044      L$A_REPP:       .ADDRESS SUMMARY        ; SUMMARY REPORT CODE POINTER
                    00000000' 0048      L$A_STATAB:     .ADDRESS 0              ; STATISTIC TABLE POINTER
                    00000000  004C      L$L_ERRTYP:     .LONG    0              ; # OF TYPES OF $ERRSOFT & $ERRPREP
                    00000051' 0050      L$A_SECNAM:     .ADDRESS SECTION        ; LIST OF SECTION NAME ADDRESSES
                    00000000' 0054      L$A_TSTCNT:     .ADDRESS L_TSTCNT       ; POINTER TO NUMBER OF TESTS
                              0058      A_HEADEND:
20 30 35 37 2F 31 31 20 58 41 56 00'  0058      T_NAME:         .ASCIC  \VAX 11/750 Specific CPU Cluster Exerciser - ZZ-ECKAX-5.2 \
55 50 43 20 63 69 66 69 63 65 70 53   0064
65 78 45 20 72 65 74 73 75 6C 43 20   0070
2D 5A 5A 20 2D 20 72 65 73 69 63 72   007C
      20 32 2E 35 2D 58 41 4B 43 45   0088
                                    39  0058
                            00000000                    .PSECT  _LAST, PAGE
                                0000    LASTAD:
                            00000000                    .PSECT  $TSTCNT, NOEXE, NOWRT, OVR, LONG
                                0000    L_TSTCNT:
                            00000142                    .RESTORE
```

```
                                0142   185          .SBTTL  Dispatch Table
                                0142   186 ;++
                                0142   187 ; Functional Description:
                                0142   188 ;
                                0142   189 ;       The Dispatch Table is a collection of addresses generated at the
                                0142   190 ;       beginning of each test and grouped together into a contiguous
                                0142   191 ;       list by the linker.  This is done by defining a PSECT called
                                0142   192 ;       DSIPATCH.
                                0142   193 ;
                                0142   194 ;--
                                0142   195
                                0142   196          $DS_DISPATCH
                                0142                        .SAVE
                               00000000                     .PSECT  DISPATCH, LONG, NOWRT, NOEXE
                                0000        DISPATCH:
                               00000000                     .PSECT  DISPATCH_X, LONG, NOWRT, NOEXE
00000000'00000000'00000000'00000000' 0000                   .LONG   0[6]
          00000000'00000000' 0010
                               00000142                     .RESTORE
                                0142   197
                                0142   198          .SBTTL  Hardware Parameter Table
                                0142   199 ;++
                                0142   200 ;
                                0142   201 ;       The hardware parameter table holds all of the hardware related
                                0142   202 ;       parameters which can be modified by the operator at run time.
                                0142   203 ;       The Daignostic Supervisor maintains a seperate copy of the
                                0142   204 ;       hardware parameter table for each unit under test.
                                0142   205 ;       The hardware parameter code section is used to actually supply
                                0142   206 ;       the values to these locations.
                                0142   207 ;--
                                0142   208
00000146                        0142   209 KA_PTABLE::      .BLKL   1               ; pointer to the CPU parameter table.
                                0146   210
```

```
                     0146   212          .SBTTL  Program Global Data Section
                     0146   213 ;++
                     0146   214 ;
                     0146   215 ; General data used by more than one module.
                     0146   216 ;
                     0146   217 ;--
                     0146   218          .SAVE
                 00000000   219          .PSECT  DATA,PAGE
                     0000   220
                     0000   221 DEV_REG:
                     0000   222
                     0000   223 ;
                     0000   224 ;       Miscellaneous data
                     0000   225 ;
                     0000   226
                 00000000  0000   227 HARDCNT::       .LONG   0               ; Exerciser summary hard
                     0004   228                                                ;  error count.
                 0000000C  0004   229 Q_TEST_TIME:    .BLKQ   1               ; Test start time, used to calculate
                     000C   230                                                ;  test run time for summary report.
                     000C   231
                     000C   232
                     000C   233 ;+
                     000C   234 ; Test summary information data block
                     000C   235 ;
                     000C   236 ;       The test summary information block is dynamically allocated, based
                     000C   237 ;       on the number of tests in the program.  There is one entry per test
                     000C   238 ;       which contains all the pertinent error and run time information.
                     000C   239 ;       This information is displayed by the SUMMARY procedure, which is
                     000C   240 ;       invoked at the end of a program run or by an operator 'SUMMARY'
                     000C   241 ;       command.
                     000C   242 ;
                     000C   243 ;--
                     000C   244
                 00000014  000C   245 SUM_A_BLOCK:    .BLKL   2               ; Two longword array to receive the
                     0014   246                                                ;  start and end addresses of the
                     0014   247                                                ;  summary information data block.
                     0014   248          .SAVE
                     0014   249          .PSECT  $ABS$
                 00000000  0610   250          . = 0
                     0000   251 $DEF     SUM_L_HARDCNT, .BLKL, 1            ; Hard error count entry displacement.
                     0000           .IIF     NB,SUM_L_HARDCNT,       SUM_L_HARDCNT:
                 00000004  0000           .IIF     NB,.BLKL,       .BLKL   1
                     0004   252 $DEF     SUM_Q_RUNTIME, .BLKQ, 1            ; Run time entry displacement.
                     0004           .IIF     NB,SUM_Q_RUNTIME,       SUM_Q_RUNTIME:
                 0000000C  0004           .IIF     NB,.BLKQ,       .BLKQ   1
                     000C   253 $DEF     SUM_K_SIZE                         ; Size of summary information block
                     000C           .IIF     NB,SUM_K_SIZE,  SUM_K_SIZE:
                     000C   254                                                ;  for one test.
                       00000014  255          .RESTORE
                           0014  256
                 00000018  0014   257 SUM_BLK_SIZE:   .BLKL   1               ; Number of pages for summary info block.
```

```
                                0018   259          .SBTTL  Program Text Section
                                0018   260 ;++
                                0018   261 ;
                                0018   262 ;       This section contains all the common character string type data
                                0018   263 ;       entries.
                                0018   264 ;
                                0018   265 ;--
                                0018   266
                                0018   267 ;+
                                0018   268 ; Program section names:
                                0018   269 ;                               MANUAL,TU58,POWER_FAIL,HALT,MCHK,IPR,WCS,PCS,ALL
                                0018   270 ;
                                0018   271 ;-
                                0018   272
                                0018   273          $DS_SECTION     MANUAL,TU58,POWER_FAIL,HALT,MCHK,IPR,WCS,PCS,ALL
                                0018       S_DEFAULT:
        54 4C 55 41 46 45 44 00' 0018                           .ASCIC  \DEFAULT\
                             07  0018
                                0020       S_MANUAL:
           4C 41 55 4E 41 4D 00' 0020                           .ASCIC  \MANUAL\
                             06  0020
                                0027       S_TU58:
                 38 35 55 54 00' 0027                           .ASCIC  \TU58\
                             04  0027
                                002C       S_POWER_FAIL:
  4C 49 41 46 5F 52 45 57 4F 50 00' 002C                        .ASCIC  \POWER_FAIL\
                             0A  002C
                                0037       S_HALT:
              54 4C 41 48 00' 0037                              .ASCIC  \HALT\
                             04  0037
                                003C       S_MCHK:
              4B 48 43 4D 00' 003C                              .ASCIC  \MCHK\
                             04  003C
                                0041       S_IPR:
                 52 50 49 00' 0041                              .ASCIC  \IPR\
                             03  0041
                                0045       S_WCS:
                 53 43 57 00' 0045                              .ASCIC  \WCS\
                             03  0045
                                0049       S_PCS:
                 53 43 50 00' 0049                              .ASCIC  \PCS\
                             03  0049
                                004D       S_ALL:
                 4C 4C 41 00' 004D                              .ASCIC  \ALL\
                             03  004D
                                0051       SECTION:
                    0000000A    0051                            .LONG   10
                    00000018'   0055                            .LONG   S_DEFAULT
                    00000020'   0059                            .LONG   S_MANUAL
                    00000027'   005D                            .LONG   S_TU58
                    0000002C'   0061                            .LONG   S_POWER_FAIL
                    00000037'   0065                            .LONG   S_HALT
                    0000003C'   0069                            .LONG   S_MCHK
                    00000041'   006D                            .LONG   S_IPR
                    00000045'   0071                            .LONG   S_WCS
```

```
                00000049' 0075                  .LONG   S_PCS
                0000004D' 0079                  .LONG   S_ALL
                          007D   274
                          007D   275
                          007D   276
                          007D   277
                          007D   278
                          007D   279 ;+
                          007D   280 ; Device mnemonics list:
                          007D   281 ;       KA750 = VAX-11/750 CPU
                          007D   282 ;-
                          007D   283          $DS_DEVTYP      KA750
      30 35 37 41 4B 00'  007D          T_KA750:              .ASCIC  \KA750\
                      05  007D
                      00  0083                  .BYTE   0
                00000001  0084          AL_DEVTYP:      .LONG   $$N
                0000007D' 0088                  .LONG   T_KA750
                          008C   284
                          008C   285
                          008C   286 ;+
                          008C   287 ; Names of device registers:  None.
                          008C   288 ;-
                          008C   289
                          008C   290
                          008C   291 ;+
                          008C   292 ; ASCII buffers
                          008C   293 ;-
                 0000000B 008C   294 BUF_SIZE = 11
                          008C   295 QWD_TIME:
                0000 000B 008C   296          .WORD   BUF_SIZE, 0
                 00000094' 0090  297          .LONG   T_TIME
                          0094   298
                 0000009F 0094   299 T_TIME: .BLKB   BUF_SIZE
                          009F   300
                          009F   301
                          009F   302 ;+
                          009F   303 ; Formatted ASCII output statements
                          009F   304 ;-
                          009F   305
                          009F   306 FMT_SUMMARY:                         ; FAO message for module summary printout.
20 57 5A 21 20 74 73 65 54 2F 21 00' 009F   307          .ASCIC  "!/Test !ZW had !ZL hard error!%s, !AS run time."
64 72 61 68 20 4C 5A 21 20 64 61 68  00AB
21 20 2C 73 25 21 72 6F 72 72 65 20  00B7
2E 65 6D 69 74 20 6E 75 72 20 53 41  00C3
                             2F      009F
                          00CF   308
                          00CF   309 ;+
                          00CF   310 ; Global ASCII strings
                          00CF   311 ;-
                          00CF   312
                    20 00' 00CF   313 SPACE1::        .ASCIC  ' '
                       01  00CF
                 20 20 00' 00D1   314 SPACE2::        .ASCIC  '  '
                       02  00D1
              20 20 20 00' 00D4   315 SPACE3::        .ASCIC  '   '
```

```
                                  03  00D4
                     20 20 20 20 00' 00D8   316 SPACE4::        .ASCIC  '    '
                                  04  00D8
                  20 20 20 20 20 00' 00DD   317 SPACE5::        .ASCIC  '     '
                                  05  00DD
               20 20 20 20 20 20 00' 00E3   318 SPACE6::        .ASCIC  '      '
                                  06  00E3
            20 20 20 20 20 20 20 00' 00EA   319 SPACE7::        .ASCIC  '       '
                                  07  00EA
         20 20 20 20 20 20 20 20 00' 00F2   320 SPACE8::        .ASCIC  '        '
                                  08  00F2
      20 20 20 20 20 20 20 20 20 00' 00FB   321 SPACE9::        .ASCIC  '         '
                                  09  00FB
   20 20 20 20 20 20 20 20 20 20 00' 0105   322 SPACE10::       .ASCIC  '          '
                                  0A  0105
```

```
0110    324          .SBTTL  Initialization Procedure
0110    325 ;++
0110    326 ; Functional description:
0110    327 ;
0110    328 ;       This routine will be executed at the beginning of each pass.
0110    329 ;       This section is responsible for control of:
0110    330 ;
0110    331 ;       A) a double iteration of the exerciser to make up 1 pass;
0110    332 ;       B) test summary information block initialization.
0110    333 ;
0110    334 ; Calling sequence:
0110    335 ;
0110    336 ;       The Diagnostic Supervisor automatically invokes this routine with
0110    337 ;       a procedure call instruction.
0110    338 ;
0110    339 ; Input parameters:
0110    340 ;
0110    341 ;       INTERS_FLAG = 0 representing 1st iteration of a double iteration
0110    342 ;                     of the dispatch table to make up 1 pass.
0110    343 ;
0110    344 ; Implicit inputs:      None
0110    345 ;
0110    346 ; Output parameters:    None
0110    347 ;
0110    348 ; Implicit outputs:     None
0110    349 ;
0110    350 ; Completion codes:     None
0110    351 ;
0110    352 ; Side effects:         None
0110    353 ;
0110    354 ;--
```

```
                          0110   356          $DS_BGNINIT
                          0110                .SAVE
                      00000000                .PSECT  INITIALIZE,LONG
                          0000        INITIALIZE:
                     0000 0000                .WORD   ^M<>                ; ENTRY MASK
         00000000'EF   D4 0002   357          CLRL    HARDCNT                     ; Initialize the test summary
                          0008   358                                              ;  hard errors counter.
                          0008   359          $DS_BPASS0      5$
                     1D   E0 0008                BBS     #DSA$V_PASS0,-      ; BR IF PASS 0
                03 0000FE00 9F   000A                    @#DSA$GL_FLAGS, 5$
                     0087   31 0010   360          BRW                 10$
                          0013   361 5$:
                          0013   362          $DS_GPHARD_S    #0, KA_PTABLE               ; Get CPU parameter table.
         00000142'EF   DF 0013                PUSHAL  KA_PTABLE
                     00   DD 0019                PUSHL   #0
              00010018 9F   02 FB 001B                CALLS   #2, @#DS$GPHARD
         00000110'EF   16 0022   363          JSB     SUMMARY_INIT                ; Structure module summary
                          0028   364                                              ; Information block
                          0028   365          $DS_GETBUF_S    PAGCNT=#3, RETADR=A_BUFFER_BEGIN
                     00   DD 0028                PUSHL   #0
                     00   DD 002A                PUSHL   #0
         00000000'EF   7F 002C                PUSHAQ  A_BUFFER_BEGIN
                     03   DD 0032                PUSHL   #3
              00010120 9F   04 FB 0034                CALLS   #4, @#DS$GETBUF
                          003B   366          $DS_GETBUF_S    PAGCNT=#1, RETADR=A_PWR_BUFFER
                     00   DD 003B                PUSHL   #0
                     00   DD 003D                PUSHL   #0
         00000008'EF   7F 003F                PUSHAQ  A_PWR_BUFFER
                     01   DD 0045                PUSHL   #1
              00010120 9F   04 FB 0047                CALLS   #4, @#DS$GETBUF
                          004E   367          $DS_GETBUF_S    PAGCNT=#1, RETADR=A_HALT_BUFFER
                     00   DD 004E                PUSHL   #0
                     00   DD 0050                PUSHL   #0
         00000010'EF   7F 0052                PUSHAQ  A_HALT_BUFFER
                     01   DD 0058                PUSHL   #1
              00010120 9F   04 FB 005A                CALLS   #4, @#DS$GETBUF
                          0061   368          $DS_GETBUF_S    PAGCNT=#1, RETADR=A_MCHK_BUFFER
                     00   DD 0061                PUSHL   #0
                     00   DD 0063                PUSHL   #0
         00000018'EF   7F 0065                PUSHAQ  A_MCHK_BUFFER
                     01   DD 006B                PUSHL   #1
              00010120 9F   04 FB 006D                CALLS   #4, @#DS$GETBUF
                          0074   369          $DS_GETBUF_S    PAGCNT=#20, RETADR=A_WCS_BUFFER
                     00   DD 0074                PUSHL   #0
                     00   DD 0076                PUSHL   #0
         00000020'EF   7F 0078                PUSHAQ  A_WCS_BUFFER
                     14   DD 007E                PUSHL   #20
              00010120 9F   04 FB 0080                CALLS   #4, @#DS$GETBUF
                          0087   370          $DS_GETBUF_S    PAGCNT=#10, RETADR=PCS$A_PCS_BUFFER
                     00   DD 0087                PUSHL   #0
                     00   DD 0089                PUSHL   #0
         00000028'EF   7F 008B                PUSHAQ  PCS$A_PCS_BUFFER
                     0A   DD 0091                PUSHL   #10
              00010120 9F   04 FB 0093                CALLS   #4, @#DS$GETBUF
                          009A   371 10$:
```

```
                        009A   372          $DS_ENDPASS_G
00010010 9F   6E   FA  009A                CALLG   (SP), a#DS$ENDPASS
                        00A1   373          $DS_ENDINIT
                        00A1         INITIALIZE_X:
00010058 9F   6E   FA  00A1                CALLG   (SP), a#DS$BREAK
                        04  00A8           RET                     ; RETURN TO DIAGNOSTIC SUPERVISOR
                        00000110           .RESTORE
```

```
                                0110   375          .SBTTL  Clean-up Procedure
                                0110   376 ;++
                                0110   377 ; Functional description:
                                0110   378 ;
                                0110   379 ;       This routine is executed at the completion of a program run.
                                0110   380 ;       This section is responsible for:
                                0110   381 ;
                                0110   382 ;       A) reinitialization of flags controlling double iteration per pass;
                                0110   383 ;       B) activation of a statistical summary report ($DS_SUMMARY_G);
                                0110   384 ;       C) releasing all temporary buffers.
                                0110   385 ;       D) clearing of IPL
                                0110   386 ;
                                0110   387 ; Calling sequence:
                                0110   388 ;
                                0110   389 ;       The Diagnostic Supervisor automatically invokes this routine with
                                0110   390 ;       a procedure call instruction.
                                0110   391 ;
                                0110   392 ; Input parameters:     None
                                0110   393 ;
                                0110   394 ; Implicit inputs:
                                0110   395 ;
                                0110   396 ;       The summary information block to be invoked by the $DS_SUMMARY_G
                                0110   397 ;       call has been dynamically filled at run time.
                                0110   398 ;
                                0110   399 ; Output parameters:    None
                                0110   400 ;
                                0110   401 ; Implicit outputs:     None
                                0110   402 ;
                                0110   403 ; Completion codes:     None
                                0110   404 ;
                                0110   405 ; Side effects:
                                0110   406 ;
                                0110   407 ;       The test summary information is destroyed after it is reported.
                                0110   408 ;
                                0110   409 ;--
                                0110   410
                                0110   411          $DS_BGNCLEAN
                                0110                        .SAVE
                         00000000                           .PSECT  CLEANUP,LONG
                                0000           CLEAN_UP:
                            0000  0000                      .WORD   ^M<>                    ; ENTRY MASK
                      55    3E    DB  0002   412          MFPR    #PR$_SID,R5               ; get the SID register
56    55    08    08    EF  0005   413          EXTZV   #8,#8,R5,R6               ; get the micro revision level
 00000090'8F    55    D1  000A   414    •     CMPL    R5,#L_REV_CHECK           ; check to see if this is a
                                000B   415                                    ; PCS module
                      07    1B  000B   416          BLEQU   NOT_PCS                   ; br = not PCS module
                                000D   417          $DS_LOADPCS_S                     ; re-load the microcode and
 000101C0 9F    00    FB  000D                            CALLS   #0, @#DS$LOADPCS
                                001A   418                                    ; patch bits
                                001A   419 NOT_PCS:
                                001A   420          $DS_CLRVEC_S    VECTOR=#SCB$L_TIMER
     000000C0 8F    DD  001A                            PUSHL   #SCB$L_TIMER
 00010168 9F    01    FB  0020                            CALLS   #1, @#DS$CLRVEC
                                0027   421          $DS_CLRVEC_S    VECTOR=#SCB$L_POWER
                      0C    DD  0027                    PUSHL   #SCB$L_POWER
```

```
                00010168 9F    01    FB  0029                        CALLS   #1, a#DS$CLRVEC
                                     0030  422          $DS_CLRVEC_S  VECTOR=#SCB$L_CHME
                     00000044 8F    DD  0030                        PUSHL   #SCB$L_CHME
                00010168 9F    01    FB  0036                        CALLS   #1, a#DS$CLRVEC
                                     003D  423          $DS_CLRVEC_S  VECTOR=#SCB$L_CHMS
                     00000048 8F    DD  003D                        PUSHL   #SCB$L_CHMS
                00010168 9F    01    FB  0043                        CALLS   #1, a#DS$CLRVEC
                                     004A  424          $DS_CLRVEC_S  VECTOR=#SCB$L_CHMU
                     0000004C 8F    DD  004A                        PUSHL   #SCB$L_CHMU
                00010168 9F    01    FB  0050                        CALLS   #1, a#DS$CLRVEC
                                     0057  425          $DS_CLRVEC_S  VECTOR=#SCB$L_CHMK
                     00000040 8F    DD  0057                        PUSHL   #SCB$L_CHMK
                00010168 9F    01    FB  005D                        CALLS   #1, a#DS$CLRVEC
                                     0064  426          $DS_CLRVEC_S  VECTOR=#SCB$L_MACHCHK
                              04    DD  0064                        PUSHL   #SCB$L_MACHCHK
                00010168 9F    01    FB  0066                        CALLS   #1, a#DS$CLRVEC
                                     006D  427          $DS_CLRVEC_S  VECTOR=#SCB$L_OPCCUS
                              14    DD  006D                        PUSHL   #SCB$L_OPCCUS
                00010168 9F    01    FB  006F                        CALLS   #1, a#DS$CLRVEC
                                     0076  428          $DS_CLRVEC_S  VECTOR=#SCB$L_OPCDEC
                              10    DD  0076                        PUSHL   #SCB$L_OPCDEC
                00010168 9F    01    FB  0078                        CALLS   #1, a#DS$CLRVEC
                                     007F  429          $DS_CLRVEC_S  VECTOR=#SCB$L_TXDB
                     000000FC 8F    DD  007F                        PUSHL   #SCB$L_TXDB
                00010168 9F    01    FB  0085                        CALLS   #1, a#DS$CLRVEC
                                     008C  430          $DS_CLRVEC_S  VECTOR=#SCB$L_RXDB
                     000000F8 8F    DD  008C                        PUSHL   #SCB$L_RXDB
                00010168 9F    01    FB  0092                        CALLS   #1, a#DS$CLRVEC
                                     0099  431          $DS_MMOFF_G
                00010158 9F    6E    FA  0099                        CALLG   (SP), a#DS$MMOFF
                                     00A0  432          $DS_INITSCB_G
                00010170 9F    6E    FA  00A0                        CALLG   (SP), a#DS$INITSCB
                                     00A7  433          $DS_SUMMARY_G
                00010028 9F    6E    FA  00A7                        CALLG   (SP), a#DS$SUMMARY
                                     00AE  434          $DS_RELBUF_S  PAGCNT=#26      ; release all data buffers
                              00    DD  00AE                        PUSHL   #0
                              00    DD  00B0                        PUSHL   #0
                              1A    DD  00B2                        PUSHL   #26
                00010128 9F    03    FB  00B4                        CALLS   #3, a#DS$RELBUF
                                     00BB  435          $DS_RELBUF_S  SUM_BLK_SIZE    ; Release summary data block.
                              00    DD  00BB                        PUSHL   #0
                              00    DD  00BD                        PUSHL   #0
                     00000014'EF    DD  00BF                        PUSHL   SUM_BLK_SIZE
                00010128 9F    03    FB  00C5                        CALLS   #3, a#DS$RELBUF
                        1C     00    DA  00CC  436          MTPR    #0,#PR750$_CSRS         ; disable TU58 interrupt 5.2
                        1E     00    DA  00CF  437          MTPR    #0,#PR750$_CSTS         ; disable TU58 interrupt 5.2
                        25     00    DA  00D2  438          MTPR    #0,#PR750$_CADR         ; make sure cache is enabled on cleanup 5.2
                                     00D5  439          $DS_SETIPL_S  LEVEL=#0        ; clear IPL
                              00    DD  00D5                        PUSHL   #0
                00010178 9F    01    FB  00D7                        CALLS   #1, a#DS$SETIPL
                                     00DE  440          $DS_ENDCLEAN
                                     00DE       CLEAN_UP_X:
                00010058 9F    6E    FA  00DE                        CALLG   (SP), a#DS$BREAK
                                     04  00E5                        RET                     ; RETURN TO DIAGNOSTIC SUPERVISOR
                                     00000110                        .RESTORE
```

```
0110   442          .SBTTL  Summary Report Procedure
0110   443 ;++
0110   444 ; Functional description:
0110   445 ;
0110   446 ;       This routine issues a summary report upon completion of a run or
0110   447 ;       upon request from the operator.
0110   448 ;       Information is taken from the 'head' of the test summary
0110   449 ;       queue (SUMMARY_INFO) and printed out in the format shown
0110   450 ;       below under "output parameters:".  The queue is accessed until
0110   451 ;       empty.
0110   452 ;
0110   453 ; Calling sequence:
0110   454 ;
0110   455 ;       CALL    SUMMARY
0110   456 ;
0110   457 ; Input parameters:     None
0110   458 ;
0110   459 ; Implicit inputs:
0110   460 ;
0110   461 ;       The test summary information block has been dynamically filled at
0110   462 ;       run time.
0110   463 ;
0110   464 ; Output parameters:
0110   465 ;
0110   466 ;       Any tests having errors will have information printed out in the
0110   467 ;       following format:
0110   468 ;*
0110   469 ;       Test xx had yy hard errors; hh:mm:ss run time.
0110   470 ;
0110   471 ;       Where,
0110   472 ;
0110   473 ;       xx      represents the relevent test number.
0110   474 ;       yy      represents the accumulated number of hard errors
0110   475 ;                encountered in the course of fulfillment of the
0110   476 ;                pass requirements.
0110   477 ;
0110   478 ;       hh:mm:ss represents the accumulated run time encountered for the
0110   479 ;                test in the course of fulfillment of pass requirements.
0110   480 ;
0110   481 ;       Note!!!!! any test not encountering errors will not appear
0110   482 ;       as part of the summary printout (i.e. if no errors existed
0110   483 ;       in the execution of the exerciser there would be no summary
0110   484 ;       printout).
0110   485 ;*
0110   486 ;
0110   487 ; Implicit outputs:     None
0110   488 ;
0110   489 ; Completion codes:     None
0110   490 ;
0110   491 ; Side effects:        None
0110   492 ;
0110   493 ;--
```

```
                                0110   495          $DS_BGNSUMMARY  <R2, R3>
                                0110                        .SAVE
                            00000000                        .PSECT  SUMMARY,LONG
                                0000        SUMMARY:
                           000C 0000                        .WORD   ^M<R2, R3>                  ; ENTRY MASK
     52   0000000C'EF      D0   0002   496          MOVL    SUM_A_BLOCK, R2                     ; Get pointer to summary info.
              53    01      D0   0009   497          MOVL    #1, R3                              ; Test number.
                                000C   498 1$:                                       ; DO
                    62      D5   000C   499          TSTL    SUM_L_HARDCNT(R2)                   ; Check for any errors and
                    2B      13   000E   500          BEQL    2$                                  ;  skip report if none.
                                0010   501          $ASCTIM_S -                                 ; Convert run time to ASCII:
                                0010   502                  TIMBUF=QWD_TIME, -                  ;  QWD of buffer for ASCII time;
                                0010   503                  TIMADR=SUM_Q_RUNTIME(R2), -         ;  64-bit run time;
                                0010   504                  CVTFLG=#1                           ;  hh:mm:ss only flag.
                    01      DD   0010                        PUSHL   #1
                 04 A2      7F   0012                        PUSHAQ  SUM_Q_RUNTIME(R2)
          0000008C'EF       7F   0015                        PUSHAQ  QWD_TIME
                    00      DD   001B                        PUSHL   #0
     00010248'GF    04      FB   001D                        CALLS   #4,G^SYS$ASCTIM
                                0024   505          $DS_PRINTS_S    FMT_SUMMARY, -              ; Display summary information:
                                0024   506                  R3, -                               ;  Test number;
                                0024   507                  SUM_L_HARDCNT(R2), -                ;  Number of hard errors;
                                0024   508                  #QWD_TIME                           ;  Test run time.
          0000008C'8F       DD   0024                        PUSHL   #QWD_TIME
                    62      DD   002A                        PUSHL   SUM_L_HARDCNT(R2)
                    53      DD   002C                        PUSHL   R3
          0000009F'EF       9F   002E                        PUSHAB  FMT_SUMMARY
     000100F8 9F    04      FB   0034                        CALLS   #$$N, a#DS$PRINTS
              52    0C      C0   003B   509 2$:      ADDL2   #SUM_K_SIZE, R2                     ; Update block pointer to next
                                003E   510                                                       ;  test.
  C6 53   00000054'FF       F3   003E   511          AOBLEQ  @L$A_TSTCNT, R3, 1$      ;   WHILE test # LEQ last test.
                                0046   512                                           ; ENDDO
                                0046   513          $DS_ENDSUMMARY
                                0046        SUMMARY_X:
     00010058 9F    6E      FA   0046                        CALLG   (SP), a#DS$BREAK
                            04   004D                        RET                      ; RETURN TO COMMAND MODE
                            00000110                        .RESTORE
```

```
                        .SBTTL  Summary Information Block Initialization Subroutine
;++
; Functional description:
;
;       This subroutine is responsible for building the structure for the
;       exerciser test summary information block.  This block will contain
;       the number of hard errors and run time for each test, which will be
;       displayed when a SUMMARY is requested.
;
; Calling sequence:
;
;       JSB     SUMMARY_INIT
;
; Input parameters:     None
;
; Implicit inputs:
;
;       L$A_TSTCNT      = Pointer to the number of tests in this program;
;       SUM_K_SIZE      = Number of bytes to be reserved for each test's data.
;
; Output parameters:    None
;
; Implicit outputs:
;
;       SUM_A_BLOCK     = Pointer to the memory reserved for the summary data;
;       @SUM_A_BLOCK    = The summary data block itself is cleared.
;
; Completion codes:     None
;
; Side effects:         None
;
;--
```

```
                                  0110   548 SUMMARY_INIT:
                        0C   BB   0110   549         PUSHR   #^M<R2, R3>
   52   0C   00000054'FF   C5   0112   550         MULL3   @L$A_TSTCNT, -          ; Compute the amount of buffer required
                                  011A   551                 #SUM_K_SIZE, R2        ;  for the summary information block.
   53   52   00000200 8F   C7   011A   552         DIVL3   #512, R2, R3            ; Convert to pages,
                        53   D6   0122   553         INCL    R3                      ;  and round up.
                                  0124   554         $DS_GETBUF_S  R3, SUM_A_BLOCK   ; Request the buffer from the Supervisor.
                        00   DD   0124                     PUSHL   #0
                        00   DD   0126                     PUSHL   #0
                   FEE0 CF   7F   0128                     PUSHAQ  SUM_A_BLOCK
                        53   DD   012C                     PUSHL   R3
        00010120 9F     04   FB   012E                     CALLS   #4, @#DS$GETBUF
                     0F 50   E8   0135   555         BLBS    R0,10$                  ; Branch if no error
                                  0138   556         $DS_ERRSYS_S
                        00   DD   0138                     PUSHL   #0
                        00   DD   013A                     PUSHL   #0
                        00   DD   013C                     PUSHL   #0
                        01   DD   013E                     PUSHL   #$ER
                                  0140       ;;; GLOBAL ERROR 1
        000100C0 9F     04   FB   0140                     CALLS   #$$M, @#DS$ERRSYS
                                  0147   557 10$:
            FEC8 CF     53   D0   0147   558         MOVL    R3, SUM_BLK_SIZE        ; Save the page count.
            52   FEBC CF     C0   014C   559         ADDL2   SUM_A_BLOCK, R2         ; Compute end of block address
        FEB9 CF   52     01   C3   0151   560         SUBL3   #1, R2, SUM_A_BLOCK+4   ;  and save it.
                        72   D4   0157   561 20$:    CLRL    -(R2)                   ; Clear out
            FEAE CF     52   D1   0159   562         CMPL    R2, SUM_A_BLOCK         ;  the summary information
                        F7   14   015E   563         BGTR    20$                     ;  block.
                                  0160   564
                        0C   BA   0160   565         POPR    #^M<R2, R3>
                        05        0162   566         RSB                             ; Return to mainline code.
```

```
0163    568          .SBTTL  Summary Information Input Subroutine
0163    569 ;++
0163    570 ; Functional description:
0163    571 ;
0163    572 ;       This subroutine is responsible for dynamically filling the test
0163    573 ;       summary information block with error data at the end of each test.
0163    574 ;
0163    575 ; Calling sequence:
0163    576 ;
0163    577 ;       JSB PART_INIT
0163    578 ;
0163    579 ; Input parameters:     None
0163    580 ;
0163    581 ;
0163    582 ; Implicit inputs:
0163    583 ;
0163    584 ;       DSA$GL_TESTNO = Current test number;
0163    585 ;       HARDCNT =       Number of hard errors, this test, this pass;
0163    586 ;       Q_TEST_TIME =   Start time of test;
0163    587 ;       SUM_A_BLOCK =   Base address of the summary information block;
0163    588 ;       SUM_K_SIZE =    Size of an entry in the summary information block.
0163    589 ;
0163    590 ; Output parameters:    None
0163    591 ;
0163    592 ; Implicit outputs:
0163    593 ;
0163    594 ;       SUM_L_HARDCNT(R2)       = Number of accumulated hard errors;
0163    595 ;       SUM_Q_RUNTIME(R2)       = Accumulated test run time.
0163    596 ;
0163    597 ; Completion codes:     None
0163    598 ;
0163    599 ; Side effects:         None
0163    600 ;
0163    601 ;--
```

```
                                  0163   603 PART_INIT::
   52   0C   0000FE50'EF    C5    0163   604         MULL3   DSA$GL_TESTNO, -          ; Grab the current test number and
                                  016B   605                  #SUM_K_SIZE, R2          ;  compute displacement into the
           52    FE9D CF    C0    016B   606         ADDL2   SUM_A_BLOCK, R2           ;  summary information block.
           62    FE8C CF    C0    0170   607         ADDL2   HARDCNT, -                ; Update the tests hard count total.
                                  0175   608                  SUM_L_HARDCNT(R2)
                 FE87 CF    D4    0175   609         CLRL    HARDCNT                   ; Reinitialize exerciser hard
                                  0179   610                                            ;  error count for next test.
                                  0179   611 ;
                                  0179   612 ; Compute current run time and add it to previous passes' run time.
                                  0179   613 ;
        04 A2    FE87 CF    C0    0179   614         ADDL2   Q_TEST_TIME, -            ; Factor in absolute start time.
                                  017F   615                  SUM_Q_RUNTIME(R2)
        04 A2    FE81 CF    D8    017F   616         ADWC    Q_TEST_TIME, SUM_Q_RUNTIME(R2)
                                  0185   617         $GETTIM_S       Q_TEST_TIME       ; Get current time.
                 FE7B CF    7F    0185                        PUSHAQ  Q_TEST_TIME
      00010378'GF    01    FB    0189                        CALLS   #1,G^SYS$GETTIM
        04 A2    FE70 CF    C2    0190   618         SUBL2   Q_TEST_TIME, -            ; Factor out absolute time;
                                  0196   619                  SUM_Q_RUNTIME(R2)        ;  result is delta time.
        04 A2    FE6A CF    D9    0196   620         SBWC    Q_TEST_TIME, SUM_Q_RUNTIME(R2)
                                  019C   621
                            05    019C   622         RSB                               ;Back into the stream of things!
                                  019D   623
                                  019D   624         $DS_ENDMOD
                                  019D   625         .END
```

```
$$E                             = 00000001
$$M                             = 00000004
$$N                             = 00000000
$$S                             = FFFFFFFF
$ENV                            = 00000001  G
$ER                             = 00000002
$MO                             = 00000001  G
$ST                             = 00000000
$TN                             = 00000000
AEM                               00000128 R      01
AKM                               00000121 R      01
ALL                             = 00000009  G
AL_DEVTYP                         00000084 R      08
ASM                               00000132 R      01
AUM                               0000013D R      01
A_BUFFER_BEGIN                    00000000 RG     01
A_BUFFER_END                      00000004 RG     01
A_HALT_BUFFER                     00000010 RG     01
A_HEADEND                         00000058 R      03
A_MCHK_BUFFER                     00000018 RG     01
A_PSLMNE                          000000CC RG     01
A_PWR_BUFFER                      00000008 RG     01
A_WCS_BUFFER                      00000020 RG     01
BUF_SIZE                        = 0000000B
CEP_FUNCTIONAL                  = 00000000
CEP_REPAIR                      = 00000001
CLEAN_UP                          00000000 R      0A
CLEAN_UP_X                        000000DE R      0A
DEFAULT                         = 00000000  G
DEV_REG                           00000000 R      08
DISPATCH                          00000000 R      06
DS$ABORT                          00010020
DS$ASKADR                         00010090
DS$ASKDATA                        00010080
DS$ASKLGCL                        00010098
DS$ASKSTR                         000100A0
DS$ASKVLD                         00010088
DS$ATTACH                         000101A8
DS$BGNSUB                         00010030
DS$BRANCH                         000100A8
DS$BREAK                          00010058
DS$CANWAIT                        00010070
DS$CHANNEL                        00010180
DS$CKLOOP                         00010040
DS$CLRVEC                         00010168
DS$CNTRLC                         00010078
DS$CVTREG                         000100B0
DS$ENDPASS                        00010010
DS$ENDSUB                         00010038
DS$ERRDEV                         000100C8
DS$ERRHARD                        000100D0
DS$ERRPREP                        00010108
DS$ERRSOFT                        000100D8
DS$ERRSYS                         000100C0
DS$ESCAPE                         00010050
DS$FREEDBGSYM                     000101B8
DS$GETBUF                         00010120
DS$GETMEM                         00010130
DS$GETTERM                        000101C8
DS$GPHARD                         00010018
DS$HELP                           000101B0
DS$INITSCB                        00010170
DS$INLOOP                         00010048
DS$K_ERROR                      = 00000002
DS$K_NORMAL                     = 00000001
DS$K_SEVERE                     = 00000004
DS$K_SUBSYS                     = 00000066
DS$K_WARNING                    = 00000000
DS$LOAD                           00010198
DS$LOADPCS                        000101C0
DS$MAPDBGBLOCK                    00010118
DS$MEMSIZE                        000101D8
DS$MMOFF                          00010158
DS$MMON                           00010150
DS$MOVPHY                         00010148
DS$MOVVRT                         00010140
DS$PARSE                          000100B8
DS$PRINTB                         000100E0
DS$PRINTF                         000100F0
DS$PRINTS                         000100F8
DS$PRINTSIG                       00010100
DS$PRINTX                         000100E8
DS$PROBE                          000101A0
DS$RELBUF                         00010128
DS$RELMEM                         00010138
DS$SERVICE_DISPATCHER             000101D0
DS$SETIPL                         00010178
DS$SETMAP                         00010188
DS$SETPRIEXV                      00010110
DS$SETVEC                         00010160
DS$SHOCHAN                        00010190
DS$SUMMARY                        00010028
DS$WAITMS                         00010060
DS$WAITUS                         00010068
DS$_ARITH                       = 006600D0
DS$_ASBE                        = 00660118
DS$_BADLINK                     = 006600F0
DS$_BADTYPE                     = 006600E8
DS$_BIIC                        = 00660120
DS$_CHME                        = 006600A8
DS$_CHMK                        = 006600E0
DS$_DEVNAME                     = 00660108
DS$_ERROR                       = 00660002
DS$_FHWE                        = 00660068
DS$_FRAGBUF                     = 00660080
DS$_ICBUSY                      = 006600C8
DS$_ICERR                       = 006600C0
DS$_IHWE                        = 00660060
DS$_ILLCHAR                     = 00660018
DS$_ILLPAGCNT                   = 00660078
```

```
DS$_ILLUNIT                     = 00660100
DS$_INSFMEM                     = 00660050
DS$_IPL2HI                      = 006600B8
DS$_IVADDR                      = 00660040
DS$_IVVECT                      = 00660038
DS$_KRNLSTK                     = 00660090
DS$_LOGIC                       = 00660070
DS$_MCHK                        = 00660088
DS$_MMOFF                       = 00660058
DS$_NEEDUNIT                    = 006600F8
DS$_NODE                        = 00660128
DS$_NOPCS                       = 00660110
DS$_NORMAL                      = 00660001
DS$_NOSUPPORT                   = 006600B1
DS$_NOTDON                      = 00660030
DS$_NOTIMP                      = 006600B0
DS$_NULLSTR                     = 00660010
DS$_OVERFLOW                    = 00660008
DS$_POWER                       = 00660098
DS$_PROGERR                     = 00660020
DS$_SEVERE                      = 00660004
DS$_TRANSL                      = 006600A0
DS$_TRUNCATE                    = 00660028
DS$_UNEXPINT                    = 006600D8
DS$_VASFULL                     = 00660048
DS$_WARNING                     = 00660000
DSA$AL_APTMAIL                    0000FE00
DSA$AT_APTTXT                     0000FA00
DSA$GL_APTCOM                     0000FE04
DSA$GL_DEVLEN                     0000FE58
DSA$GL_ERRNO                      0000FE44
DSA$GL_EVENT                      0000FE48
DSA$GL_FLAGS                      0000FE00
DSA$GL_MSGTYP                     0000FE40
DSA$GL_PASSES                     0000FE08
DSA$GL_PASSNO                     0000FE54
DSA$GL_SECTNO                     0000FE10
DSA$GL_SID                        0000FE14
DSA$GL_SUBTNO                     0000FE4C
DSA$GL_TESTNO                     0000FE50
DSA$GL_UNITS                      0000FE0C
DSA$GQ_MSGPTR                     0000FE68
DSA$GT_DEVNAM                     0000FE5C
DSA$V_PASS0                     = 0000001D
ENV$M_DOMAIN                    = 00000002
ENV$M_LEVEL                     = 00000001
ENV$M_SUPER                     = 000003FC
ENV$S_DOMAIN                    = 00000001
ENV$S_LEVEL                     = 00000001
ENV$S_SUPER                     = 00000008
ENV$V_DOMAIN                    = 00000001
ENV$V_LEVEL                     = 00000000
ENV$V_SUPER                     = 00000002
ENV$_CPU                        = 00000000
ENV$_FUNCTIONAL                 = 00000000
ENV$_REPAIR                     = 00000001
ENV$_SUPER                      = 00000001
ENV$_SYSTEM                     = 00000001
FMT_SUMMARY                       0000009F R      08
GPR_TABLE                         00000048 RG     01
HALT                            = 00000004   G
HARDCNT                           00000000 RG     08
HP$A_DEPENDENT                    00000032
HP$A_DEVICE                       00000018
HP$A_DVA                          0000001C
HP$A_LINK                         00000020
HP$B_DRIVE                        0000000B
HP$B_FLAGS                        0000000A
HP$Q_DEVICE                       00000000
HP$T_DEVICE                       0000000C
HP$T_TYPE                         00000026
HP$W_SIZE                         00000008
HP$W_VECTOR                       00000024
INITIALIZE                        00000000 R      09
INITIALIZE_X                      000000A1 R      09
IPR                             = 00000006   G
KA$B_ACC_TYPE                     00000042
KA$B_SID_TYPE                     0000003D
KA$K_LEN                          00000043
KA$L_FLAGS                        00000032
KA$L_SID                          0000003A
KA$W_LATENCY                      0000003E
KA$W_PROGRESS                     00000040
KA$W_RESERVED                     00000038
KA$W_WCS                          00000036
KA750                           = 00000001
KA_PTABLE                         00000142 RG     01
L$A_CCP                           00000040 R      03
L$A_DEVP                          0000001C R      03
L$A_DREG                          00000024 R      03
L$A_DTP                           00000018 R      03
L$A_ICP                           0000003C R      03
L$A_LASTAD                        00000014 R      03
L$A_NAME                          00000008 R      03
L$A_REPP                          00000044 R      03
L$A_SECNAM                        00000050 R      03
L$A_STATAB                        00000048 R      03
L$A_TSTCNT                        00000054 R      03
L$L_ENVIRON                       00000004 R      03
L$L_ERRTYP                        0000004C R      03
L$L_HEADLENGTH                    00000000 R      03
L$L_REV                           0000000C R      03
L$L_UNIT                          00000020 R      03
L$L_UPDATE                        00000010 R      03
LASTAD                            00000000 R      04
L_ACT_ISP                         00000038 RG     01
L_ACT_KSP                         00000034 RG     01
L_ACT_PSL                         0000003C RG     01
L_ACT_SP                          00000030 RG     01
L_EXP_AP                          00000078 RG     01
```

```
L_EXP_FP                        0000007C RG     01
L_EXP_ISP                       00000088 RG     01
L_EXP_KSP                       00000084 RG     01
L_EXP_PSL                       0000008C RG     01
L_EXP_SP                        00000080 RG     01
L_ISP                           00000044 RG     01
L_KSP                           00000040 RG     01
L_REV_CHECK                     00000090 RG     01
L_TSTCNT                        00000000 R      05
MANUAL                        = 00000001   G
MCHK                          = 00000005   G
MODELIST                        0000010D RG     01
NOT_PCS                         0000001A R      0A
PAR$M_ATDEF                   = 00000010
PAR$M_ATHI                    = 00000008
PAR$M_ATLO                    = 00000004
PAR$M_NODEF                   = 00000002
PAR$V_ATDEF                   = 00000004
PAR$V_ATHI                    = 00000003
PAR$V_ATLO                    = 00000002
PAR$V_NODEF                   = 00000001
PAR$_BIN                      = 00000002
PAR$_DEC                      = 0000000A
PAR$_HEX                      = 00000010
PAR$_NO                       = 00000000
PAR$_OCT                      = 00000008
PAR$_YES                      = 00000001
PART_INIT                       00000163 RG     08
PCS                           = 00000008   G
PCS$A_PCS_BUFFER                00000028 RG     01
POWER_FAIL                    = 00000003   G
PR$_SID                       = 0000003E
PR750$_CADR                   = 00000025
PR750$_CSRS                   = 0000001C
PR750$_CSTS                   = 0000001E
PSL$K_EXEC                    = 00000001
PSL$K_KERNEL                  = 00000000
PSL$K_SUPER                   = 00000002
PSL$K_USER                    = 00000003
PSL$M_CBIT                    = 00000001
PSL$M_NBIT                    = 00000008
PSL$M_VBIT                    = 00000002
PSL$M_ZBIT                    = 00000004
PSL$V_CBIT                    = 00000000
PSL$V_NBIT                    = 00000003
PSL$V_VBIT                    = 00000001
PSL$V_ZBIT                    = 00000002
QWD_TIME                        0000008C R      08
Q_TEST_TIME                     00000004 R      08
REG_TABLE                       00000094 RG     01
SCB$L_ACCESS                    00000020
SCB$L_ARITH                     00000034
SCB$L_BREAK                     0000002C
SCB$L_CHME                      00000044
SCB$L_CHMK                      00000040
SCB$L_CHMS                      00000048
SCB$L_CHMU                      0000004C
SCB$L_COMPAT                    00000030
SCB$L_KNLSTK                    00000008
SCB$L_MACHCHK                   00000004
SCB$L_OPCCUS                    00000014
SCB$L_OPCDEC                    00000010
SCB$L_POWER                     0000000C
SCB$L_RADRMOD                   0000001C
SCB$L_ROPRAND                   00000018
SCB$L_RXDB                      000000F8
SCB$L_SFTLVL1                   00000084
SCB$L_SFTLVL10                  000000A8
SCB$L_SFTLVL11                  000000AC
SCB$L_SFTLVL12                  000000B0
SCB$L_SFTLVL13                  000000B4
SCB$L_SFTLVL14                  000000B8
SCB$L_SFTLVL15                  000000BC
SCB$L_SFTLVL2                   00000088
SCB$L_SFTLVL3                   0000008C
SCB$L_SFTLVL4                   00000090
SCB$L_SFTLVL5                   00000094
SCB$L_SFTLVL6                   00000098
SCB$L_SFTLVL7                   0000009C
SCB$L_SFTLVL8                   000000A0
SCB$L_SFTLVL9                   000000A4
SCB$L_TBIT                      00000028
SCB$L_TIMER                     000000C0
SCB$L_TRANSL                    00000024
SCB$L_TXDB                      000000FC
SCB$L_ZERO                      00000000
SECTION                         00000051 R      08
SEP_FUNCTIONAL                = 00000002
SEP_REPAIR                    = 00000003
SIZ...                        = 00000001
SPACE1                          000000CF RG     08
SPACE10                         00000105 RG     08
SPACE2                          000000D1 RG     08
SPACE3                          000000D4 RG     08
SPACE4                          000000D8 RG     08
SPACE5                          000000DD RG     08
SPACE6                          000000E3 RG     08
SPACE7                          000000EA RG     08
SPACE8                          000000F2 RG     08
SPACE9                          000000FB RG     08
SUMMARY                         00000000 R      0B
SUMMARY_INIT                    00000110 R      08
SUMMARY_X                       00000046 R      0B
SUM_A_BLOCK                     0000000C R      08
SUM_BLK_SIZE                    00000014 R      08
SUM_K_SIZE                      0000000C
SUM_L_HARDCNT                   00000000
SUM_Q_RUNTIME                   00000004
SYS$ALLOC                       00010238
SYS$ASCTIM                      00010248   G
```

```
SYS$ASSIGN                      00010250
SYS$BINTIM                      00010258
SYS$CANCEL                      00010260
SYS$CANTIM                      00010268
SYS$CLOSE                       000105B8
SYS$CLREF                       00010298
SYS$CONNECT                     000105C0
SYS$DALLOC                      000102D8
SYS$DASSGN                      000102E0
SYS$DISCONNECT                  000105D0
SYS$FAO                         00010350
SYS$FAOL                        00010358
SYS$GET                         00010580
SYS$GETCHN                      000104C8
SYS$GETTIM                      00010378  G
SYS$LKWSET                      000103A0
SYS$NUMTIM                      000103B8
SYS$OPEN                        00010608
SYS$QIO                         000103C8
SYS$QIOW                        00010200
SYS$READ                        00010590
SYS$READEF                      000103D0
SYS$SETAST                      000103F8
SYS$SETEF                       00010400
SYS$SETIMR                      00010420
SYS$SETPRI                      00010428
SYS$SETPRT                      00010430
SYS$SETRWM                      00010438
SYS$SETSWM                      00010448
SYS$ULKPAG                      00010460
SYS$ULWSET                      00010468
SYS$UNWIND                      00010470
SYS$WAITFR                      00010478
SYS$WFLAND                      00010488
SYS$WFLOR                       00010490
S_ALL                           0000004D R      08
S_DEFAULT                       00000018 R      08
S_HALT                          00000037 R      08
S_IPR                           00000041 R      08
S_MANUAL                        00000020 R      08
S_MCHK                          0000003C R      08
S_PCS                           00000049 R      08
S_POWER_FAIL                    0000002C R      08
S_TU58                          00000027 R      08
S_WCS                           00000045 R      08
TU58                        =   00000002  G
T_KA750                         0000007D R      08
T_NAME                          00000058 R      03
T_TIME                          00000094 R      08
WCS                         =   00000007  G
```

Psect synopsis

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
ECKAX1	00000146 (326.)	01 (1.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
ABS	00010610 (67088.)	02 (2.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE
$HEADER	00000092 (146.)	03 (3.)	NOPIC USR CON REL LCL NOSHR NOEXE RD NOWRT NOVEC PAGE
_LAST	00000000 (0.)	04 (4.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC PAGE
$TSTCNT	00000000 (0.)	05 (5.)	NOPIC USR OVR REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG
DISPATCH	00000000 (0.)	06 (6.)	NOPIC USR CON REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG
DISPATCH_X	00000018 (24.)	07 (7.)	NOPIC USR CON REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG
DATA	0000019D (413.)	08 (8.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC PAGE
INITIALIZE	000000A9 (169.)	09 (9.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC LONG
CLEANUP	000000E6 (230.)	0A (10.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC LONG
SUMMARY	0000004E (78.)	0B (11.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC LONG

Symbol Cross Reference

SYMBOL	VALUE	DEFINITION	REFERENCES...
$$E	=00000001	411 (8)	373 (7) 440 (8)
$$M	=00000004	556 (12)	556 (12)
$$N	=00000000	556 (12)	273 (5) 283 (5) 508 (10) 556 (12)
$$S	=FFFFFFFF	67 (2)	
$ENV	=00000001	67 (2)	183 (3)
$ER	=00000002	556 (12)	356 (7) 411 (8) #-556 (12)
$MO	=00000001	624 (14)	624 (14)
$ST	=00000000	440 (8)	373 (7) 440 (8) 556 (12)
$TN	=00000000	67 (2)	356 (7) 411 (8) 495 (10) 624 (14)
AEM	00000128-R	163 (2)	158 (2)
AKM	00000121-R	162 (2)	157 (2)
ALL	=00000009	273 (5)	
AL_DEVTYP	00000084-R	283 (5)	183 (3)
ASM	00000132-R	164 (2)	159 (2)
AUM	0000013D-R	165 (2)	160 (2)
A_BUFFER_BEGIN	00000000-R	92 (2)	365 (7)
A_BUFFER_END	00000004-R	93 (2)	
A_HALT_BUFFER	00000010-R	95 (2)	367 (7)
A_HEADEND	00000058-R	183 (3)	183 (3)
A_MCHK_BUFFER	00000018-R	96 (2)	368 (7)
A_PSLMNE	000000CC-R	152 (2)	
A_PWR_BUFFER	00000008-R	94 (2)	366 (7)
A_WCS_BUFFER	00000020-R	97 (2)	369 (7)
BIT...	=00000011	83 (2)	67 (2) 79 (2) 82 (2) 83 (2)
BUF_SIZE	=0000000B	294 (5)	296 (5) 299 (5)
CEP_FUNCTIONAL	=00000000	67 (2)	
CEP_REPAIR	=00000001	67 (2)	67 (2)
CLEAN_UP	00000000-R	411 (8)	183 (3)
CLEAN_UP_X	000000DE-R	440 (8)	
DEFAULT	=00000000	273 (5)	
DEV_REG	00000000-R	221 (4)	183 (3)
DISPATCH	00000000-R	196 (3)	183 (3)
DS$BREAK	00010058		373 (7) 440 (8) 513 (10)
DS$CLRVEC	00010168		420 (8) 421 (8) 422 (8) 423 (8) 424 (8) 425 (8) 426 (8) 427 (8) 428 (8) 429 (8) 430 (8)
DS$ENDPASS	00010010		372 (7)
DS$ERRSYS	000100C0		556 (12)
DS$GETBUF	00010120		365 (7) 366 (7) 367 (7) 368 (7) 369 (7) 370 (7) 554 (12)
DS$GPHARD	00010018		362 (7)
DS$INITSCB	00010170		432 (8)
DS$K_ERROR	=00000002	79 (2)	
DS$K_NORMAL	=00000001	79 (2)	
DS$K_SEVERE	=00000004	79 (2)	
DS$K_SUBSYS	=00000066	79 (2)	79 (2)
DS$K_WARNING	=00000000	79 (2)	
DS$LOADPCS	000101C0		417 (8)

```
DS$MMOFF                        00010158                        431     (8)
DS$PRINTS                       000100F8                        508     (10)
DS$RELBUF                       00010128                        434     (8)     435     (8)
DS$SETIPL                       00010178                        439     (8)
DS$SUMMARY                      00010028                        433     (8)
DS$_ARITH                      =006600D0        79     (2)
DS$_ASBE                       =00660118        79     (2)
DS$_BADLINK                    =006600F0        79     (2)
DS$_BADTYPE                    =006600E8        79     (2)
DS$_BIIC                       =00660120        79     (2)
DS$_CHME                       =006600A8        79     (2)
DS$_CHMK                       =006600E0        79     (2)
DS$_DEVNAME                    =00660108        79     (2)
DS$_ERROR                      =00660002        79     (2)
DS$_FHWE                       =00660068        79     (2)
DS$_FRAGBUF                    =00660080        79     (2)
DS$_ICBUSY                     =006600C8        79     (2)
DS$_ICERR                      =006600C0        79     (2)
DS$_IHWE                       =00660060        79     (2)
DS$_ILLCHAR                    =00660018        79     (2)
DS$_ILLPAGCNT                  =00660078        79     (2)
DS$_ILLUNIT                    =00660100        79     (2)
DS$_INSFMEM                    =00660050        79     (2)
DS$_IPL2HI                     =006600B8        79     (2)
DS$_IVADDR                     =00660040        79     (2)
DS$_IVVECT                     =00660038        79     (2)
DS$_KRNLSTK                    =00660090        79     (2)
DS$_LOGIC                      =00660070        79     (2)
DS$_MCHK                       =00660088        79     (2)
DS$_MMOFF                      =00660058        79     (2)
DS$_NEEDUNIT                   =006600F8        79     (2)
DS$_NODE                       =00660128        79     (2)
DS$_NOPCS                      =00660110        79     (2)
DS$_NORMAL                     =00660001        79     (2)
DS$_NOSUPPORT                  =006600B1        79     (2)
DS$_NOTDON                     =00660030        79     (2)
DS$_NOTIMP                     =006600B0        79     (2)     79      (2)
DS$_NULLSTR                    =00660010        79     (2)
DS$_OVERFLOW                   =00660008        79     (2)
DS$_POWER                      =00660098        79     (2)
DS$_PROGERR                    =00660020        79     (2)
DS$_SEVERE                     =00660004        79     (2)
DS$_TRANSL                     =006600A0        79     (2)
DS$_TRUNCATE                   =00660028        79     (2)
DS$_UNEXPINT                   =006600D8        79     (2)
DS$_VASFULL                    =00660048        79     (2)
DS$_WARNING                    =00660000        79     (2)     79      (2)
DSA$GL_FLAGS                    0000FE00                        359     (7)
DSA$GL_TESTNO                   0000FE50                        #-604   (14)
DSA$V_PASS0                    =0000001D                        #-359   (7)
ENV$M_DOMAIN                   =00000002        67     (2)
ENV$M_LEVEL                    =00000001        67     (2)
ENV$M_SUPER                    =000003FC        67     (2)
ENV$S_DOMAIN                   =00000001        67     (2)
ENV$S_LEVEL                    =00000001        67     (2)
```

```
ENV$S_SUPER                     =00000008     67     (2)
ENV$V_DOMAIN                    =00000001     67     (2)      67     (2)
ENV$V_LEVEL                     =00000000     67     (2)      67     (2)
ENV$V_SUPER                     =00000002     67     (2)      183    (3)
ENV$_CPU                        =00000000     67     (2)      67     (2)
ENV$_FUNCTIONAL                 =00000000     67     (2)      67     (2)
ENV$_REPAIR                     =00000001     67     (2)      67     (2)
ENV$_SUPER                      =00000001     67     (2)      183    (3)
ENV$_SYSTEM                     =00000001     67     (2)      67     (2)
FMT_SUMMARY                      0000009F-R   306    (5)      508    (10)
GPR_TABLE                        00000048-R   107    (2)
HALT                            =00000004     273    (5)
HARDCNT                          00000000-R   227    (4)    #-357    (7)    #-607    (14)    #-609    (14)
INITIALIZE                       00000000-R   356    (7)      183    (3)
INITIALIZE_X                     000000A1-R   373    (7)
IPR                             =00000006     273    (5)
KA750                           =00000001     283    (5)
KA_PTABLE                        00000142-R   209    (3)      362    (7)
L$A_CCP                          00000040-R   183    (3)
L$A_DEVP                         0000001C-R   183    (3)
L$A_DREG                         00000024-R   183    (3)
L$A_DTP                          00000018-R   183    (3)
L$A_ICP                          0000003C-R   183    (3)
L$A_LASTAD                       00000014-R   183    (3)
L$A_NAME                         00000008-R   183    (3)
L$A_REPP                         00000044-R   183    (3)
L$A_SECNAM                       00000050-R   183    (3)
L$A_STATAB                       00000048-R   183    (3)
L$A_TSTCNT                       00000054-R   183    (3)    #-511    (10)    #-550    (12)
L$L_ENVIRON                      00000004-R   183    (3)
L$L_ERRTYP                       0000004C-R   183    (3)
L$L_HEADLENGTH                   00000000-R   183    (3)
L$L_REV                          0000000C-R   183    (3)
L$L_UNIT                         00000020-R   183    (3)
L$L_UPDATE                       00000010-R   183    (3)
LASTAD                           00000000-R   183    (3)      183    (3)
L_ACT_ISP                        00000038-R   102    (2)
L_ACT_KSP                        00000034-R   101    (2)
L_ACT_PSL                        0000003C-R   103    (2)
L_ACT_SP                         00000030-R   100    (2)
L_EXP_AP                         00000078-R   120    (2)
L_EXP_FP                         0000007C-R   121    (2)
L_EXP_ISP                        00000088-R   124    (2)
L_EXP_KSP                        00000084-R   123    (2)
L_EXP_PSL                        0000008C-R   125    (2)
L_EXP_SP                         00000080-R   122    (2)
L_ISP                            00000044-R   105    (2)
L_KSP                            00000040-R   104    (2)
L_REV_CHECK                      00000090-R   127    (2)    #-414    (8)
L_TSTCNT                         00000000-R   183    (3)      183    (3)
MANUAL                          =00000001     273    (5)
MCHK                            =00000005     273    (5)
MODELIST                         0000010D-R   156    (2)
NOT_PCS                          0000001A-R   419    (8)    #-416    (8)
PAR$M_ATDEF                     =00000010     82     (2)
```

```
PAR$M_ATHI                      =00000008     82     (2)
PAR$M_ATLO                      =00000004     82     (2)
PAR$M_NODEF                     =00000002     82     (2)
PAR$V_ATDEF                     =00000004     82     (2)
PAR$V_ATHI                      =00000003     82     (2)
PAR$V_ATLO                      =00000002     82     (2)
PAR$V_NODEF                     =00000001     82     (2)
PAR$_BIN                        =00000002     82     (2)
PAR$_DEC                        =0000000A     82     (2)
PAR$_HEX                        =00000010     82     (2)
PAR$_NO                         =00000000     82     (2)
PAR$_OCT                        =00000008     82     (2)
PAR$_YES                        =00000001     82     (2)
PART_INIT                        00000163-R   603    (14)
PCS                             =00000008     273    (5)
PCS$A_PCS_BUFFER                 00000028-R   98     (2)      370     (7)
POWER_FAIL                      =00000003     273    (5)
PR$_SID                         =0000003E                  #-412    (8)
PR750$_CADR                     =00000025                  #-438    (8)
PR750$_CSRS                     =0000001C                  #-436    (8)
PR750$_CSTS                     =0000001E                  #-437    (8)
PSL$K_EXEC                      =00000001     83     (2)
PSL$K_KERNEL                    =00000000     83     (2)
PSL$K_SUPER                     =00000002     83     (2)
PSL$K_USER                      =00000003     83     (2)
PSL$M_CBIT                      =00000001     83     (2)
PSL$M_NBIT                      =00000008     83     (2)
PSL$M_VBIT                      =00000002     83     (2)
PSL$M_ZBIT                      =00000004     83     (2)
PSL$V_CBIT                      =00000000     83     (2)
PSL$V_NBIT                      =00000003     83     (2)
PSL$V_VBIT                      =00000001     83     (2)
PSL$V_ZBIT                      =00000002     83     (2)
QWD_TIME                         0000008C-R   295    (5)      504     (10)    #-508    (10)
Q_TEST_TIME                      00000004-R   229    (4)    #-614     (14)    #-616    (14)    617    (14)    #-618    (14)
                                                       #-620     (14)
REG_TABLE                        00000094-R   132    (2)
SCB$L_CHME                       00000044                   #-422    (8)
SCB$L_CHMK                       00000040                   #-425    (8)
SCB$L_CHMS                       00000048                   #-423    (8)
SCB$L_CHMU                       0000004C                   #-424    (8)
SCB$L_MACHCHK                    00000004                   #-426    (8)
SCB$L_OPCCUS                     00000014                   #-427    (8)
SCB$L_OPCDEC                     00000010                   #-428    (8)
SCB$L_POWER                      0000000C                   #-421    (8)
SCB$L_RXDB                       000000F8                   #-430    (8)
SCB$L_TIMER                      000000C0                   #-420    (8)
SCB$L_TXDB                       000000FC                   #-429    (8)
SECTION                          00000051-R   273    (5)      183     (3)
SEP_FUNCTIONAL                  =00000002     67     (2)
SEP_REPAIR                      =00000003     67     (2)
SIZ...                          =00000001     83     (2)      67      (2)     82      (2)     83     (2)
SPACE1                           000000CF-R   313    (5)
SPACE10                          00000105-R   322    (5)
SPACE2                           000000D1-R   314    (5)
```

```
SPACE3                          000000D4-R   315    (5)
SPACE4                          000000D8-R   316    (5)
SPACE5                          000000DD-R   317    (5)
SPACE6                          000000E3-R   318    (5)
SPACE7                          000000EA-R   319    (5)
SPACE8                          000000F2-R   320    (5)
SPACE9                          000000FB-R   321    (5)
SUMMARY                         00000000-R   495    (10)     183    (3)
SUMMARY_INIT                    00000110-R   548    (12)     363    (7)
SUMMARY_X                       00000046-R   513    (10)
SUM_A_BLOCK                     0000000C-R   245    (4)    #-496    (10)     554    (12)    #-559    (12)    #-560    (12)
                                                           #-562    (12)   #-606    (14)
SUM_BLK_SIZE                    00000014-R   257    (4)    #-435    (8)    #-558    (12)
SUM_K_SIZE                      0000000C     253    (4)    #-509    (10)   #-551    (12)    #-605    (14)
SUM_L_HARDCNT                   00000000     251    (4)    #-499    (10)   #-508    (10)    #-608    (14)
SUM_Q_RUNTIME                   00000004     252    (4)      504    (10)   #-615    (14)    #-616    (14)    #-619    (14)
                                                         #-620    (14)
SYS$ASCTIM                      00010248                      504    (10)
SYS$GETTIM                      00010378                      617    (14)
S_ALL                           0000004D-R   273    (5)      273    (5)
S_DEFAULT                       00000018-R   273    (5)      273    (5)
S_HALT                          00000037-R   273    (5)      273    (5)
S_IPR                           00000041-R   273    (5)      273    (5)
S_MANUAL                        00000020-R   273    (5)      273    (5)
S_MCHK                          0000003C-R   273    (5)      273    (5)
S_PCS                           00000049-R   273    (5)      273    (5)
S_POWER_FAIL                    0000002C-R   273    (5)      273    (5)
S_TU58                          00000027-R   273    (5)      273    (5)
S_WCS                           00000045-R   273    (5)      273    (5)
TU58                           =00000002     273    (5)
T_KA750                         0000007D-R   283    (5)      283    (5)
T_NAME                          00000058-R   183    (3)      183    (3)
T_TIME                          00000094-R   299    (5)      297    (5)
WCS                            =00000007     273    (5)
```

Macros Cross Reference

MACRO	SIZE	DEFINITION	REFERENCES...
$ASCTIM_S	1	502 (10)	502 (10)
$D1_ERR	1	556 (12)	556 (12)
$D1_ERR_S	1	556 (12)	556 (12)
$D1_PRINT_S	1	508 (10)	508 (10)
$D1_SEC	1	273 (5)	273 (5)
$DEF	1	83 (2)	251 (4) 252 (4) 253 (4)
$DEFINI	1	77 (2)	77 (2) 78 (2) 80 (2) 81 (2) 83 (2)
			84 (2) 85 (2) 86 (2)
$DS_BGNCLEAN	1	411 (8)	411 (8)
$DS_BGNINIT	1	356 (7)	356 (7)
$DS_BGNMOD	1	67 (2)	67 (2)
$DS_BGNSUMMARY	1	495 (10)	495 (10)
$DS_BPASS0	1	359 (7)	359 (7)
$DS_BREAK	1	373 (7)	373 (7) 440 (8) 513 (10)
$DS_CLRVEC_S	1	420 (8)	420 (8) 421 (8) 422 (8) 423 (8) 424 (8)
			425 (8) 426 (8) 427 (8) 428 (8) 429 (8)
			430 (8)
$DS_DEVTYP	1	283 (5)	283 (5)
$DS_DISPATCH	1	196 (3)	196 (3)
$DS_DSADEF	5	81 (2)	81 (2)
$DS_DSDEF	2	79 (2)	79 (2)
$DS_DSSDEF	8	80 (2)	80 (2)
$DS_ENDCLEAN	1	440 (8)	440 (8)
$DS_ENDINIT	1	373 (7)	373 (7)
$DS_ENDMOD	1	624 (14)	624 (14)
$DS_ENDPASS_G	1	372 (7)	372 (7)
$DS_ENDSUMMARY	1	513 (10)	513 (10)
$DS_ENVDEF	2	67 (2)	67 (2)
$DS_ERRSYS_S	1	556 (12)	556 (12)
$DS_GETBUF_S	1	365 (7)	365 (7) 366 (7) 367 (7) 368 (7) 369 (7)
			370 (7) 554 (12)
$DS_GPHARD_S	1	362 (7)	362 (7)
$DS_HEADER	4	181 (3)	181 (3)
$DS_HPODEF	2	85 (2)	85 (2)
$DS_INITSCB_G	1	432 (8)	432 (8)
$DS_LOADPCS_S	1	417 (8)	417 (8)
$DS_MMOFF_G	1	431 (8)	431 (8)
$DS_PARDEF	1	82 (2)	82 (2)
$DS_PRINTS_S	1	505 (10)	505 (10)
$DS_PSLDEF	1	83 (2)	83 (2)
$DS_RELBUF_S	1	434 (8)	434 (8) 435 (8)
$DS_SCBDEF	3	78 (2)	78 (2)
$DS_SECTION	2	273 (5)	273 (5)
$DS_SETIPL_S	1	439 (8)	439 (8)
$DS_SUMMARY_G	1	433 (8)	433 (8)
$EQU	1	83 (2)	67 (2) 79 (2) 82 (2) 83 (2)
$EQULS1	1	83 (2)	67 (2) 79 (2) 83 (2)
$EQULST	1	67 (2)	67 (2) 79 (2) 83 (2)

```
$GBLINI          2          67    (2)       67    (2)       79    (2)       82    (2)       83    (2)
$GETTIM_S        1         617   (14)      617   (14)
$PR750DEF        1          77    (2)       77    (2)
$PRDEF           4          84    (2)       84    (2)
$PSLDEF          2          83    (2)       83    (2)
$PUSHADR         1         365    (7)      365    (7)      366    (7)      367    (7)      368    (7)      369    (7)
                                           370    (7)      434    (8)      435    (8)      504   (10)      554   (12)
                                           556   (12)      617   (14)
$VIELD           1          67    (2)       67    (2)       82    (2)       83    (2)
$VIELD1          1          83    (2)       67    (2)       82    (2)       83    (2)
KA_DEF           2          86    (2)       86    (2)
```

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	129	00:00:00.30	00:00:00.73
Command processing	917	00:00:00.67	00:00:01.26
Pass 1	704	00:00:09.23	00:00:16.56
Symbol table sort	0	00:00:00.56	00:00:00.80
Pass 2	17	00:00:01.86	00:00:02.87
Symbol table output	2	00:00:00.20	00:00:00.38
Psect synopsis output	2	00:00:00.03	00:00:00.03
Cross-reference output	6	00:00:00.80	00:00:01.15
Assembler run totals	1779	00:00:13.65	00:00:23.79

```
The working set limit was 2762 pages.
88846 bytes (174 pages) of virtual memory were used to buffer the intermediate code.
There were 30 pages of symbol table space allocated to hold 603 non-local and 6 local symbols.
625 source lines were read in Pass 1, producing 34 object records in Pass 2.
125 pages of virtual memory were used to define 40 macros.
```

Macro library statistics

Macro library name	Macros defined
DISK$DIAGPACK02:[TAYLOR.ECKAX]ECKAX.MLB;1	1
SYS$COMMON:[SYSLIB]DIAG.MLB;955	38
SYS$COMMON:[SYSLIB]STARLET.MLB;1	11
TOTALS (all libraries)	50

```
947 GETS were required to define 50 macros.

There were no errors, warnings or information messages.

MACRO/LIS=ECKAX1.LIS/CROSS ECKAX1
```

Table of contents

(1)	1	ECKAX2: RESERVED PROCESSOR REGISTERS
(2)	68	DECLARATIONS
(3)	118	Data Tables
(4)	193	ERROR MESSAGES
(5)	226	SUBROUTINES AND SERVICE ROUTINES
(6)	240	TEST 1: Reserved Processor Registers
(7)	258	SUBTEST 1.1: Reserved Processor Register Numbers
(8)	328	SUBTEST 1.2: Read only Processor Registers
(9)	394	SUBTEST 1.3: Write only Processor Registers
(10)	464	SUBTEST 1.4: Processor Register 28

```
                        .SBTTL  ECKAX2: RESERVED PROCESSOR REGISTERS
                        .TITLE  ECKAX2  VAX-11/750 Specific CPU Cluster Exerciser
                        .IDENT  /5.2/

                ;
                ; Copyright (C) 1980,1983,1986
                ; Digital Equipment Corporation, Maynard, Massachusetts 01754
                ;
                ; This software is furnished  under a license for use only on a single
                ; computer  system and  may be  copied only with  the inclusion of the
                ; above copyright notice.  This software, or any other copies thereof,
                ; may not be provided or  otherwise made available to any other person
                ; except for use on such system and to one who agrees to these license
                ; terms.  Title to and  ownership of the  software  shall at all times
                ; remain in DEC.
                ;
                ; The information in this software is subject to change without notice
                ; and should  not be construed  as a commitment  by Digital  Equipment
                ; Corporation.
                ;
                ; DEC assumes  no  responsibility  for  the use or  reliability of its
                ; software on equipment which is not supplied by DEC.
                ;

                ;++
                ; Facility:     VAX Architecture Diagnostic.
                ;
                ; Abstract:     This module tests that all processor register numbers not
                ;               implemented on the VAX-11/750 will cause a reseved operand
                ;               fault for a MTPR or MFPR instruction. Also internal processor
                ;               registers specific to the VAX-11/750 which are write only and
                ;               read only are checked to not cause reserved operand faults
                ;               when writing and reading respectively and do in the converse
                ;               situation.
                ;
                ;
                ; Environment:  VAX Diagnostic Supervisor.
                ;
                ; Author:       Fred Roemer  19-Feb-81  Version 2.0
                ;
                ;       NO CHANGES TO THIS MODULE FOR VERSION 3.3 (DOCUMENT CHANGE ONLY)
                ;
                ;
                ;       Dan Milleville  19-Mar-82                   Version 3.4
                ;       Changed Test 3 exit code to accomodate temporarily a hardware problem.
                ;
                ;       Dave Shull      30-Nov-82                   Version 4.0
                ;       Added tests 13 and 14 for coverage of PCS module.
                ;
                ;       Tai-Chun Pan    04-Mar-83                   Version 5.0
                ;       Added test 5 for coverage of Processor Halts Architecture Undefined.
                ;       Added tests 11 and 12 for coverage of new ROM with MRSP of TU58.
                ;
                ;       Dan Milleville  21-Nov-83                   Version 5.1
                ;       Fixed error in timer routine (didn't turn off timer).
```

```
                        0000     56 ;
                        0000     57 ;       Wayne R. Taylor February 1986          Version 5.2
                        0000     58 ;       Redefine IPR's to jive with starlet.
                        0000     59 ;       Modified the code for problem report Eckax5 where:
                        0000     60 ;               Tests 6 & 13 tests with cache off.
                        0000     61 ;               Subtest 1 does not check bit 0 of the memory under test.
                        0000     62 ;               Subtest 4 tests row 0, 1, 2, but not row 3.
                        0000     63 ;       Modifications were supplied by the submitter.
                        0000     64 ;       Search on 5.2.
                        0000     65 ;
                        0000     66 ;--
```

```
                     0000     68          .SBTTL  DECLARATIONS
                     0000     69          .LIST   MEB
                     0000     70          .NLIST  CND
                  00000000    71          .PSECT  ECKAXA, PAGE, NOWRT
                     0000     72          .LIBRARY        "SYS$LIBRARY:DIAG"; VAX family diagnostic library.
                     0000     73          $DS_BGNMOD      CEP_REPAIR, TN=1
                     0000        ;;;      Macro-32 Diagnostic macro library Version 8.3 "DIAG.MLB (245)"
                     0000     74
                     0000     75 ;
                     0000     76 ; Include files:
                     0000     77 ;
                     0000     78
                     0000     79          .LIBRARY        "ECKAX"         ; CPU Cluster Exerciser library.
                     0000     80
                     0000     81
                     0000     82 ;
                     0000     83 ; Equated symbols:
                     0000     84 ;
                     0000     88
                     0000     89          $DS_PARDEF
                     0000     90          $DS_PSLDEF
                     0000     91          $PRDEF
                     0000     92          $PR750DEF       ; 5.2
                     0000     93          $DS_SCBDEF
                     0000     94          $DS_DSDEF
                     0000     95          $DS_DSADEF
                     0000     96          $DS_DSSDEF
                     0000     97          $DS_HPODEF
                     0000     98          KA_DEF
                     0000     99          $DS_ERRDEF
                     0000    100          ECKAX_SECDEF
                     0000    101
                     0000    102 ;
                     0000    103 ; Own storage:
                     0000    104 ;
                     0000    105
  00000004           0000    106 L_REG_ADD:       .BLKL           ; contains the register address
  00000005           0004    107 B_FLAGS:         .BLKB           ; contains the following flags
                     0005    108
  00000000           0005    109 V_NO_FAULT=0                     ; bit position - fault did not occur
  00000001           0005    110 M_NO_FAULT=1a0                   ; bit mask - expected fault did not occur
  00000001           0005    111 V_FAULT=1                        ; bit position - fault sucess flag
  00000002           0005    112 M_FAULT=1a1                      ; bit mask - fault sucess flag
                     0005    116
```

```
                    0005   118          .SBTTL  Data Tables
                    0005   119
                    0005   120 ; This is a table that contains the unused internal processor register
                    0005   121 ; numbers. This table is terminated by a -1.
                    0005   122
00000005            0005   123 ADDRESS_TABLE:  .LONG    ^X5
00000006            0009   124                 .LONG    ^X6
00000007            000D   125                 .LONG    ^X7
0000000E            0011   126                 .LONG    ^XE
0000000F            0015   127                 .LONG    ^XF
00000016            0019   128                 .LONG    ^X16
00000029            001D   129                 .LONG    ^X29
0000002A            0021   130                 .LONG    ^X2A
0000002B            0025   131                 .LONG    ^X2B
0000002C            0029   132                 .LONG    ^X2C
0000002D            002D   133                 .LONG    ^X2D
0000002E            0031   134                 .LONG    ^X2E
0000002F            0035   135                 .LONG    ^X2F
00000030            0039   136                 .LONG    ^X30
00000031            003D   137                 .LONG    ^X31
00000032            0041   138                 .LONG    ^X32
00000033            0045   139                 .LONG    ^X33
00000034            0049   140                 .LONG    ^X34
00000035            004D   141                 .LONG    ^X35
00000036            0051   142                 .LONG    ^X36
0000003F            0055   143                 .LONG    ^X3F
0000003C            0059   144                 .LONG    ^X3C
00000040            005D   145                 .LONG    ^X40
00000080            0061   146                 .LONG    ^X80
00000100            0065   147                 .LONG    ^X100
00000200            0069   148                 .LONG    ^X200
00000400            006D   149                 .LONG    ^X400
00000800            0071   150                 .LONG    ^X800
00001000            0075   151                 .LONG    ^X1000
00002000            0079   152                 .LONG    ^X2000
00004000            007D   153                 .LONG    ^X4000
00008000            0081   154                 .LONG    ^X8000
00010000            0085   155                 .LONG    ^X10000
00020000            0089   156                 .LONG    ^X20000
00040000            008D   157                 .LONG    ^X40000
00080000            0091   158                 .LONG    ^X80000
00100000            0095   159                 .LONG    ^X100000
00200000            0099   160                 .LONG    ^X200000
00400000            009D   161                 .LONG    ^X400000
00800000            00A1   162                 .LONG    ^X800000
01000000            00A5   163                 .LONG    ^X1000000
02000000            00A9   164                 .LONG    ^X2000000
04000000            00AD   165                 .LONG    ^X4000000
08000000            00B1   166                 .LONG    ^X8000000
10000000            00B5   167                 .LONG    ^X10000000
20000000            00B9   168                 .LONG    ^X20000000
40000000            00BD   169                 .LONG    ^X40000000
80000000            00C1   170                 .LONG    ^X80000000
FFFFFFFF            00C5   171                 .LONG    ^XFFFFFFFF
                    00C9   172
```

```
                    00C9    173
                    00C9    174 ; This is a table that contains the write only internal processor register
                    00C9    175 ; numbers. This table is terminated by a -1.
                    00C9    176
                    00C9    177 WRITE_TABLE:
00000037            00C9    178                     .LONG   ^X37
0000003F            00CD    179                     .LONG   ^X3F
FFFFFFFF            00D1    180                     .LONG   ^XFFFFFFFF
                    00D5    181
                    00D5    182
                    00D5    183 ; This is a table that contains the read only internal processor register
                    00D5    184 ; numbers. This table is terminated by a -1.
                    00D5    185
                    00D5    186 READ_TABLE:
00000017            00D5    187                     .LONG   ^X17
FFFFFFFF            00D9    188                     .LONG   ^XFFFFFFFF
                    00DD    189
                    00DD    190
                    00DD    191
```

```
                                        00DD   193          .SBTTL  ERROR MESSAGES
                                        00DD   194 ;-------------------------------------------------------------------------
                                        00DD   195 T_NO_FAULT_TO:
45 52 20 64 65 74 63 65 70 78 45 00'    00DD   196          .ASCIC  "Expected RESERVED OPERAND FAULT did not occur durring!/"-
41 52 45 50 4F 20 44 45 56 52 45 53     00E9
64 69 64 20 54 4C 55 41 46 20 44 4E     00F5
64 20 72 75 63 63 6F 20 74 6F 6E 20     0101
65 76 6F 6D 2F 21 67 6E 69 72 72 75     010D
67 65 6C 6C 69 20 6E 61 20 6F 74 20     0119
72 6F 73 73 65 63 6F 72 70 20 6C 61     0125
64 61 20 72 65 74 73 69 67 65 72 20     0131
              2F 21 73 73 65 72 64      013D
                                  66    00DD
                                        0144   197                  "move to an illegal processor register address!/"
                                        0144   198 ;-------------------------------------------------------------------------
                                        0144   199 T_FAULT_ERR_F:
20 64 65 74 63 65 70 78 65 6E 55 00'    0144   200          .ASCIC  "Unexpected RESERVED OPERAND FAULT occured while attempting!/"-
45 50 4F 20 44 45 56 52 45 53 45 52     0150
6F 20 54 4C 55 41 46 20 44 4E 41 52     015C
65 6C 69 68 77 20 64 65 72 75 63 63     0168
21 67 6E 69 74 70 6D 65 74 74 61 20     0174
                                  2F    0180
20 61 20 6E 6F 20 52 50 46 4D 20 61     0181   201                  "a MFPR on a legal processor register address!/"
73 65 63 6F 72 70 20 6C 61 67 65 6C     018D
72 65 74 73 69 67 65 72 20 72 6F 73     0199
      2F 21 73 73 65 72 64 64 61 20     01A5
                                  6A    0144
                                        01AF   202 ;-------------------------------------------------------------------------
                                        01AF   203 T_NO_FAULT_FROM:
45 52 20 64 65 74 63 65 70 78 45 00'    01AF   204          .ASCIC  "Expected RESERVED OPERAND FAULT did not occur durring!/"-
41 52 45 50 4F 20 44 45 56 52 45 53     01BB
64 69 64 20 54 4C 55 41 46 20 44 4E     01C7
64 20 72 75 63 63 6F 20 74 6F 6E 20     01D3
              2F 21 67 6E 69 72 72 75   01DF
6E 61 20 6D 6F 72 66 20 65 76 6F 6D     01E7   205                  "move from an illegal processor register address!/"
6F 72 70 20 6C 61 67 65 6C 6C 69 20     01F3
73 69 67 65 72 20 72 6F 73 73 65 63     01FF
21 73 73 65 72 64 64 61 20 72 65 74     020B
                                  2F    0217
                                  68    01AF
                                        0218   206 ;-------------------------------------------------------------------------
                                        0218   207 T_FAULT_ERR_T:
20 64 65 74 63 65 70 78 65 6E 55 00'    0218   208          .ASCIC  "Unexpected RESERVED OPERAND FAULT occured while attempting!/"-
45 50 4F 20 44 45 56 52 45 53 45 52     0224
6F 20 54 4C 55 41 46 20 44 4E 41 52     0230
65 6C 69 68 77 20 64 65 72 75 63 63     023C
21 67 6E 69 74 70 6D 65 74 74 61 20     0248
                                  2F    0254
20 61 20 6E 6F 20 52 50 54 4D 20 61     0255   209                  "a MTPR on a legal processor register address!/"
73 65 63 6F 72 70 20 6C 61 67 65 6C     0261
72 65 74 73 69 67 65 72 20 72 6F 73     026D
      2F 21 73 73 65 72 64 64 61 20     0279
                                  6A    0218
                                        0283   210 ;-------------------------------------------------------------------------
                                        0283   211 T_FPA_ERR:
```

```
6F 70 20 67 6E 69 74 61 6F 6C 46 00'  0283    212          .ASCIC  "Floating point accelerator type does not match type in"<13><10>-
61 72 65 6C 65 63 63 61 20 74 6E 69   028F
65 6F 64 20 65 70 79 74 20 72 6F 74   029B
20 68 63 74 61 6D 20 74 6F 6E 20 73   02A7
              0D 6E 69 20 65 70 79 74   02B3
72 6F 20 2C 65 6C 62 61 74 20 50 0A   02BB    213                  "P table, or IPR 28 is not operating properly"<13><10>
6E 20 73 69 20 38 32 20 52 50 49 20   02C7
67 6E 69 74 61 72 65 70 6F 20 74 6F   02D3
   0A 0D 79 6C 72 65 70 6F 72 70 20   02DF
                                 66   0283
                                      02EA    214 ;-----------------------------------------------------------------------
                                      02EA    215 T_REG_ADD:
41 20 72 65 74 73 69 67 65 52 20 00'  02EA    216          .ASCIC  " Register Addressed  =   ^X  !XL   !/"
20 3D 20 20 64 65 73 73 65 72 64 64   02F6
20 20 20 4C 58 21 20 20 58 5E 20 20   0302
                           2F 21      030E
                              25      02EA
                                      0310    217 ;-----------------------------------------------------------------------
                                      0310    218
                                      0310    219 ERR_MESSAGE:
                                      0310    220          $DS_BGNMESSAGE
                                0000  0310                       .WORD   ^M<>                ; ENTRY MASK
                                      0312    221          $DS_PRINTB_S    FORMAT=@ERR$_P1(AP)
                             14 BC    9F     0312                   PUSHAB  @ERR$_P1(AP)
                 000100E0 9F    01    FB     0315                   CALLS   #$$N, @#DS$PRINTB
                                      031C    222          $DS_PRINTB_S    FORMAT=T_REG_ADD,P0=L_REG_ADD
                          FCE0 CF     DD     031C                   PUSHL   L_REG_ADD
                            C7 AF     9F     0320                   PUSHAB  T_REG_ADD
                 000100E0 9F    02    FB     0323                   CALLS   #$$N, @#DS$PRINTB
                                      032A    223          $DS_ENDMESSAGE
                                04    032A                   RET                         ; RETURN TO DIAGNOSTIC SUPERVISOR
                                      032B    224
```

```
                     032B   226          .SBTTL SUBROUTINES AND SERVICE ROUTINES
                     032B   227
                     032B   228
                     032B   229 ; This routine will service all reserved operand faults.
                     032B   230
                     032B   231
                     032B   232          .ALIGN  LONG
                     032C   233 FAULT_SERVICE:
          6E   57    D0   032C   234          MOVL    R7,(SP)                 ; put return address on stack
    FCD0  CF   02    88   032F   235          BISB2   #M_FAULT,B_FLAGS        ; set the fault flag
                     02   0334   236          REI                             ; return
                          0335   237
                          0335   238          $DS_PAGE
```

```
                     0335              .SBTTL  TEST 1:  Reserved Processor Registers
                00000000                       .PSECT  TEST_001, PAGE, NOWRT
                     0020
                     0020    241 ;++
                     0020    242 ; Test description:
                     0020    243 ;
                     0020    244 ;       This test checks that processor numbers not used by the VAX-11/750
                     0020    245 ;       cause reserve operand faults for the MFPR and MTPR instructions.
                     0020    246 ;       Also processor numbers 17, 28 and 37 (X) are checked to not cause
                     0020    247 ;       reserved operand faults when accessed.
                     0020    248 ;
                     0020    249 ; Assumptions:
                     0020    250 ;
                     0020    251 ;
                     0020    252 ;--
                     0020    253
                     0020    254         $DS_BGNTEST     <IPR,ALL,DEFAULT>
                     0020        DATA_001:
                00000000  0020                .LONG   0               ; TEST ARGUMENT TABLE TERMINATOR
                     0024        TEST_001::
                    0000  0024                .WORD   ^M<>            ; ENTRY MASK
                     0026    255
                     0026    256         $DS_PAGE
```

```
                                0026                    .SBTTL  SUBTEST 1.1:  Reserved Processor Register Numbers
                                0026    259 ;+
                                0026    260 ; Subtest description:
                                0026    261 ;
                                0026    262 ;       This subtest checks all the reserved processor register numbers that
                                0026    263 ;       are not used in the VAX-11/750 processor.
                                0026    264 ;
                                0026    265 ; Subtest steps:
                                0026    266 ;       SUBTEST RESERVED PROCESSOR REGISTER NUMBERS
                                0026    267 ;       :  Initialize pointer to address table
                                0026    268 ;       :  Get reserved operand fault vector to handle exception
                                0026    269 ;       :  REPEAT
                                0026    270 ;       :  :  Clear error flags
                                0026    271 ;       :  :  Get address of register to attempt access
                                0026    272 ;       :  :  Attempt MTPR on register
                                0026    273 ;       :  :  Check for errors
                                0026    274 ;       :  :  IF any errors
                                0026    275 ;       :  :  :  THEN
                                0026    276 ;       :  :  :  Report error
                                0026    277 ;       :  :  :  Exit test
                                0026    278 ;       :  :  ENDIF
                                0026    279 ;       :  :  Attempt MFPR on register
                                0026    280 ;       :  :  Check for errors
                                0026    281 ;       :  :  IF any errors
                                0026    282 ;       :  :  :  THEN
                                0026    283 ;       :  :  :  Report error
                                0026    284 ;       :  :  :  Exit test
                                0026    285 ;       :  :  ENDIF
                                0026    286 ;       :  : UNTIL All unused addresses done
                                0026    287 ;       :  ENDREPEAT
                                0026    288 ;       ENDSUBTEST RESERVED PROCESSOR REGISTER NUMBERS
                                0026    289 ;
                                0026    290 ;
                                0026    291 ;
                                0026    292 ;
                                0026    293 ;-
                                0026    294             $DS_BGNSUB
                                0026        T1_S1::
00010030 9F   00000000'EF   FA  0026                    CALLG   $S$, a#DS$BGNSUB
                                0031    295             $DS_SETVEC_S    VECTOR=#SCB$L_ROPRAND   SRVADR=FAULT_SERVICE
                      00    DD  0031                    PUSHL   #0
          0000032C'EF       DF  0033                    PUSHAL  FAULT_SERVICE
                      18    DD  0039                    PUSHL   #SCB$L_ROPRAND
       00010160 9F    03    FB  003B                    CALLS   #3, a#DS$SETVEC
       53   00000005'EF    9E  0042    296             MOVAB   ADDRESS_TABLE,R3            ; load R3 with address of table
       57   0000006A'EF    9E  0049    297 NEXT:       MOVAB   RENTRY_1,R7                 ; load R7 with address of rentry point
            00000004'EF    94  0050    298             CLRB    B_FLAGS                     ; initialize error flag
                   53      63  D0  0056    299         MOVL    (R3),R5                     ; load address of IPR to access
       00000000'EF         55  D0  0059    300         MOVL    R5,L_REG_ADD                ; save register address for error
                   55      01  DA  0060    301         MTPR    #1,R5                       ; access IPR (should cause fault)
            00000004'EF    01  88  0063    302         BISB2   #M_NO_FAULT,B_FLAGS         ; flag no fault error
                                006A    303 RENTRY_1:
     19 00000004'EF    00  E1  006A    304             BBC     #V_NO_FAULT,B_FLAGS,3$      ; br = MTPR did cause fault
                                0072    305             $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_NO_FAULT_TO
          000000DD'8F       DD  0072                    PUSHL   #T_NO_FAULT_TO
```

```
                00000310'EF   DF   0078                    PUSHAL  ERR_MESSAGE
                        00    DD   007E                    PUSHL   #0
                        00    DD   0080                    PUSHL   #0
                        01    DD   0082                    PUSHL   #$ER
                             0084        ;;; TEST 1, SUBTEST 1, ERROR 1
            000100D0 9F   05   FB   0084                    CALLS   #$$M, a#DS$ERRHARD
        57  000000A5'EF   9E   008B   306 3$:      MOVAB   RENTRY_2,R7             ; load R7 with address of rentry point
            00000004'EF   94   0092   307          CLRB    B_FLAGS                 ; initialize error flag
                   55     83   D0   0098   308          MOVL    (R3)+,R5                ; load address of IPR to access
                   56     55   DB   009B   309          MFPR    R5,R6                   ; access IPR (should cause fault)
        00000004'EF       01   88   009E   310          BISB2   #M_NO_FAULT,B_FLAGS     ; set no fault error flag
                             00A5   311 RENTRY_2:
     19 00000004'EF       00   E1   00A5   312          BBC     #V_NO_FAULT,B_FLAGS,5$  ; br = MFPR did cause fault
                             00AD   313          $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_NO_FAULT_FROM
                000001AF'8F   DD   00AD                    PUSHL   #T_NO_FAULT_FROM
                00000310'EF   DF   00B3                    PUSHAL  ERR_MESSAGE
                        00    DD   00B9                    PUSHL   #0
                        00    DD   00BB                    PUSHL   #0
                        02    DD   00BD                    PUSHL   #$ER
                             00BF        ;;; TEST 1, SUBTEST 1, ERROR 2
            000100D0 9F   05   FB   00BF                    CALLS   #$$M, a#DS$ERRHARD
                   63     3F   D1   00C6   314 5$:      CMPL    #^X3F,(R3)              ; At register 3F?
                          0B   12   00C9   315          BNEQ    7$                      ; Branch if no
            0000FE15'EF   3E   91   00CB   316          CMPB    #62,DSA$GL_SID+1        ; Is this a rev 62 or higher machine?
                          02   14   00D2   317          BGTR    7$                      ; branch if no
                          83   D5   00D4   318          TSTL    (R3)+                   ; Skip register 3F
        63  FFFFFFFF       8F   D1   00D6   319 7$:      CMPL    #-1,(R3)                ; check for end of table
                          03   13   00DD   320          BEQL    8$                      ; br = finished with all addresses
                        FF67   31   00DF   321          BRW     NEXT                    ; go do next address
                             00E2   322 8$:      $DS_CLRVEC_S    VECTOR=#SCB$L_ROPRAND
                          18   DD   00E2                    PUSHL   #SCB$L_ROPRAND
                00010168 9F   01   FB   00E4                    CALLS   #1, a#DS$CLRVEC
                             00EB   323
                             00EB   324          $DS_ENDSUB
                             00EB       T1_S1_X:
    00010038 9F   00000000'EF   FA   00EB                    CALLG   $S$, a#DS$ENDSUB
                             00F6   325
                             00F6   326          $DS_PAGE
```

```
                                00F6                    .SBTTL  SUBTEST 1.2:  Read only Processor Registers
                                00F6    329 ;+
                                00F6    330 ; Subtest description:
                                00F6    331 ;
                                00F6    332 ;       This subtest checks processor registers which are read only
                                00F6    333 ;       registers. These are all processor specific registers.
                                00F6    334 ;       This subtest does a read and checks that the read is
                                00F6    335 ;       successful and a reserved operand fault does not occur. Then an
                                00F6    336 ;       attempt to write the register is made which should cause a reserved
                                00F6    337 ;       operand fault. If an errors are encountered they are reported.
                                00F6    338 ;
                                00F6    339 ;
                                00F6    340 ; Subtest steps:
                                00F6    341 ;
                                00F6    342 ;       SUBTEST READ ONLY PROCESSOR REGISTERS
                                00F6    343 ;       : Get reserved operand fault vector to handle exception
                                00F6    344 ;       : REPEAT
                                00F6    345 ;       : : Clear error flags
                                00F6    346 ;       : : Attempt MTPR on register
                                00F6    347 ;       : : Check for errors
                                00F6    348 ;       : : IF any errors
                                00F6    349 ;       : : : THEN
                                00F6    350 ;       : : : Report error
                                00F6    351 ;       : : : Exit test
                                00F6    352 ;       : : ENDIF
                                00F6    353 ;       : : Attempt MFPR on register
                                00F6    354 ;       : : Check for errors
                                00F6    355 ;       : : IF any errors
                                00F6    356 ;       : : : THEN
                                00F6    357 ;       : : : Report error
                                00F6    358 ;       : : : Exit test
                                00F6    359 ;       : : ENDIF
                                00F6    360 ;       : : UNTIL All read only registers are done
                                00F6    361 ;       : ENDREPEAT
                                00F6    362 ;       ENDSUBTEST READ ONLY PROCESSOR REGISTERS
                                00F6    363 ;
                                00F6    364 ;
                                00F6    365 ;
                                00F6    366 ;-
                                00F6    367             $DS_BGNSUB
                                00F6        T1_S2::
00010030 9F   0000000C'EF   FA  00F6                    CALLG   $S$, a#DS$BGNSUB
         53   000000D5'EF   9E  0101    368           MOVAB   READ_TABLE,R3           ; load R3 with address of table
                                0108    369           $DS_SETVEC_S    VECTOR=#SCB$L_ROPRAND   SRVADR=FAULT_SERVICE
                         00     DD  0108                    PUSHL   #0
                   0000032C'EF  DF  010A                    PUSHAL  FAULT_SERVICE
                         18     DD  0110                    PUSHL   #SCB$L_ROPRAND
              00010160 9F   03  FB  0112                    CALLS   #3, a#DS$SETVEC
                    55   63  D0  0119    370 NEXT1:  MOVL    (R3),R5                 ; load address of IPR to access
         00000000'EF   55  D0  011C    371           MOVL    R5,L_REG_ADD            ; save register address for error
         57   0000013A'EF  9E  0123    372           MOVAB   RENTRY_3,R7             ; load R7 with address of rentry point
                   00000004'EF  94  012A    373           CLRB    B_FLAGS                 ; initialize error flag
                    55   01  DA  0130    374           MTPR    #1,R5                   ; access IPR (should cause fault)
         00000004'EF   01  88  0133    375           BISB2   #M_NO_FAULT,B_FLAGS     ; set no fault error flag
                                013A    376 RENTRY_3:
```

```
                19 00000004'EF   00    E1  013A   377          BBC     #V_NO_FAULT,B_FLAGS,3$  ; br = MTPR did cause fault
                                       0142   378          $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_NO_FAULT_TO
                      000000DD'8F   DD  0142                       PUSHL   #T_NO_FAULT_TO
                      00000310'EF   DF  0148                       PUSHAL  ERR_MESSAGE
                                00  DD  014E                       PUSHL   #0
                                00  DD  0150                       PUSHL   #0
                                01  DD  0152                       PUSHL   #$ER
                                       0154              ;;; TEST 1, SUBTEST 2, ERROR 1
                   000100D0 9F   05   FB  0154                       CALLS   #$$M, a#DS$ERRHARD
                   57   0000016B'EF   9E  015B   379 3$:     MOVAB   RENTRY_4,R7             ; load R7 with address of rentry point
                        00000004'EF   94  0162   380          CLRB    B_FLAGS                 ; initialize error flag
                             56   55   DB  0168   381          MFPR    R5,R6                   ; access IPR (should not cause fault)
                                       016B   382 RENTRY_4:
                19 00000004'EF   01    E1  016B   383          BBC     #V_FAULT,B_FLAGS,5$     ; br = exception rountine executed
                                       0173   384          $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_FAULT_ERR_F
                      00000144'8F   DD  0173                       PUSHL   #T_FAULT_ERR_F
                      00000310'EF   DF  0179                       PUSHAL  ERR_MESSAGE
                                00  DD  017F                       PUSHL   #0
                                00  DD  0181                       PUSHL   #0
                                02  DD  0183                       PUSHL   #$ER
                                       0185              ;;; TEST 1, SUBTEST 2, ERROR 2
                   000100D0 9F   05   FB  0185                       CALLS   #$$M, a#DS$ERRHARD
                                83   D5  018C   385 5$:     TSTL    (R3)+                   ; Point at next register address
                   63   FFFFFFFF 8F   D1  018E   386          CMPL    #-1,(R3)                ; check for end of table
                                03   13  0195   387          BEQL    8$                      ; br = finished with all addresses
                             FF7F   31  0197   388          BRW     NEXT1                   ; go do next address
                                       019A   389 8$:     $DS_CLRVEC_S    VECTOR=#SCB$L_ROPRAND
                                18   DD  019A                       PUSHL   #SCB$L_ROPRAND
                   00010168 9F   01   FB  019C                       CALLS   #1, a#DS$CLRVEC
                                       01A3   390          $DS_ENDSUB
                                       01A3       T1_S2_X:
00010038 9F   0000000C'EF   FA  01A3                       CALLG   $S$, a#DS$ENDSUB
                                       01AE   391
                                       01AE   392          $DS_PAGE
```

```
                                01AE                    .SBTTL  SUBTEST 1.3:  Write only Processor Registers
                                01AE    395 ;+
                                01AE    396 ; Subtest description:
                                01AE    397 ;
                                01AE    398 ;       This subtest checks processor registers which are write only
                                01AE    399 ;       registers. These are processor specific registers. This subtest does
                                01AE    400 ;       a write and checks that it is successful and a reserved operand fault
                                01AE    401 ;       does not occur. Then an attempt to read the register is made which
                                01AE    402 ;       should cause a reserved operand fault. If an errors are encountered
                                01AE    403 ;       they are reported.
                                01AE    404 ;
                                01AE    405 ;
                                01AE    406 ; Subtest steps:
                                01AE    407 ;       SUBTEST WRITE ONLY PROCESSOR REGISTERS
                                01AE    408 ;       :  Get reserved operand fault vector to handle exception
                                01AE    409 ;       :  Clear error flags
                                01AE    410 ;       :  REPEAT
                                01AE    411 ;       :  :  Attempt MTPR on register
                                01AE    412 ;       :  :  Check for errors
                                01AE    413 ;       :  :  IF any errors
                                01AE    414 ;       :  :  :  THEN
                                01AE    415 ;       :  :  :  Report error
                                01AE    416 ;       :  :  :  Exit test
                                01AE    417 ;       :  :  ENDIF
                                01AE    418 ;       :  :  Attempt MFPR on register
                                01AE    419 ;       :  :  Check for errors
                                01AE    420 ;       :  :  IF any errors
                                01AE    421 ;       :  :  :  THEN
                                01AE    422 ;       :  :  :  Report error
                                01AE    423 ;       :  :  :  Exit test
                                01AE    424 ;       :  :  ENDIF
                                01AE    425 ;       :  : UNTIL all write only registers are done
                                01AE    426 ;       :  ENDREPEAT
                                01AE    427 ;       ENDSUBTEST WRITE ONLY PROCESSOR REGISTERS
                                01AE    428 ;
                                01AE    429 ;
                                01AE    430 ;
                                01AE    431 ;-
                                01AE    432         $DS_BGNSUB
                                01AE        T1_S3::
00010030 9F   00000018'EF   FA  01AE                CALLG   $S$, a#DS$BGNSUB
                                01B9    433         $DS_SETVEC_S    VECTOR=#SCB$L_ROPRAND   SRVADR=FAULT_SERVICE
                      00    DD  01B9                PUSHL   #0
              0000032C'EF   DF  01BB                PUSHAL  FAULT_SERVICE
                      18    DD  01C1                PUSHL   #SCB$L_ROPRAND
          00010160 9F   03    FB  01C3                CALLS   #3, a#DS$SETVEC
          53  000000C9'EF   9E  01CA    434         MOVAB   WRITE_TABLE,R3          ; load R3 with address of table
                                01D1    435         $DS_SETVEC_S    VECTOR=#SCB$L_ROPRAND   SRVADR=FAULT_SERVICE
                      00    DD  01D1                PUSHL   #0
              0000032C'EF   DF  01D3                PUSHAL  FAULT_SERVICE
                      18    DD  01D9                PUSHL   #SCB$L_ROPRAND
          00010160 9F   03    FB  01DB                CALLS   #3, a#DS$SETVEC
                   55   83    D0  01E2    436 NEXT2:  MOVL    (R3)+,R5                ; load address of IPR to access
          00000000'EF   55    D0  01E5    437         MOVL    R5,L_REG_ADD            ; save register address for error
          57  00000203'EF   9E  01EC    438         MOVAB   RENTRY_5,R7             ; load R7 with address of rentry point
```

```
                00000004'EF   94   01F3   439          CLRB    B_FLAGS                     ; initialize error flag
                     56   55   DB   01F9   440          MFPR    R5,R6                       ; access IPR (should cause fault)
           00000004'EF   01   88   01FC   441          BISB2   #M_NO_FAULT,B_FLAGS          ; set no fault error flag
                              0203   442 RENTRY_5:
        19 00000004'EF   00   E1   0203   443          BBC     #V_NO_FAULT,B_FLAGS,3$      ; br = MFPR did cause fault
                              020B   444          $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_NO_FAULT_TO
                000000DD'8F   DD   020B                       PUSHL   #T_NO_FAULT_TO
                00000310'EF   DF   0211                       PUSHAL  ERR_MESSAGE
                         00   DD   0217                       PUSHL   #0
                         00   DD   0219                       PUSHL   #0
                         01   DD   021B                       PUSHL   #$ER
                              021D       ;;; TEST 1, SUBTEST 3, ERROR 1
           000100D0 9F   05   FB   021D                       CALLS   #$$M, a#DS$ERRHARD
           57   00000234'EF   9E   0224   445 3$:     MOVAB   RENTRY_6,R7                 ; load R7 with address of rentry point
                00000004'EF   94   022B   446          CLRB    B_FLAGS                     ; initialize error flag
                     55   01   DA   0231   447          MTPR    #1,R5                       ; access IPR (should not cause fault)
                              0234   448 RENTRY_6:
        19 00000004'EF   01   E1   0234   449          BBC     #V_FAULT,B_FLAGS,5$         ; br = no exception occured
                              023C   450          $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_FAULT_ERR_T
                00000218'8F   DD   023C                       PUSHL   #T_FAULT_ERR_T
                00000310'EF   DF   0242                       PUSHAL  ERR_MESSAGE
                         00   DD   0248                       PUSHL   #0
                         00   DD   024A                       PUSHL   #0
                         02   DD   024C                       PUSHL   #$ER
                              024E       ;;; TEST 1, SUBTEST 3, ERROR 2
           000100D0 9F   05   FB   024E                       CALLS   #$$M, a#DS$ERRHARD
                     63   3F   D1   0255   451 5$:     CMPL    #^X3F,(R3)                  ; At register 3F?
                          0B   12   0258   452          BNEQ    7$                          ; Branch if no
           0000FE15'EF   3E   91   025A   453          CMPB    #62,DSA$GL_SID+1            ; Is this lower than rev 62 machine?
                          02   19   0261   454          BLSS    7$                          ; branch if yes
                          83   D5   0263   455          TSTL    (R3)+                       ; Skip register 3F
           63   FFFFFFFF 8F   D1   0265   456 7$:     CMPL    #-1,(R3)                    ; check for end of table
                          03   13   026C   457          BEQL    8$                          ; br = finished with all addresses
                      FF71   31   026E   458          BRW     NEXT2                       ; go do next address
                              0271   459 8$:     $DS_CLRVEC_S    VECTOR=#SCB$L_ROPRAND
                          18   DD   0271                       PUSHL   #SCB$L_ROPRAND
           00010168 9F   01   FB   0273                       CALLS   #1, a#DS$CLRVEC
                              027A   460          $DS_ENDSUB
                              027A       T1_S3_X:
00010038 9F   00000018'EF   FA   027A                       CALLG   $S$, a#DS$ENDSUB
                              0285   461
                              0285   462          $DS_PAGE
```

```
                                0285                    .SBTTL  SUBTEST 1.4:  Processor Register 28
                                0285    465 ;+
                                0285    466 ; Subtest description:
                                0285    467 ;
                                0285    468 ;       This subtest checks processor register 28 which contains the floating
                                0285    469 ;       point accelerator control and status information. An attempt to turn
                                0285    470 ;       the accelerator on is made and then the status is compared to the
                                0285    471 ;       entry in the P TABLE, setup by the operator. The type is checked and
                                0285    472 ;       if any errors are detected they are reported.
                                0285    473 ;
                                0285    474 ;
                                0285    475 ; Subtest steps:
                                0285    476 ;       SUBTEST PROCESSOR REGISTER 28
                                0285    477 ;       :  Get reserved operand fault vector to handle exception
                                0285    478 ;       :  Clear error flags
                                0285    479 ;       :  Attempt MTPR on register 28 to turn FPA on
                                0285    480 ;       :  Check for reserved operand fault error
                                0285    481 ;       :  IF an error
                                0285    482 ;       :  :  THEN
                                0285    483 ;       :  :  Report error
                                0285    484 ;       :  :  Exit test
                                0285    485 ;       :  ENDIF
                                0285    486 ;       :  Attempt MFPR on register 28 to read type
                                0285    487 ;       :  Check type read matches type in P TABLE
                                0285    488 ;       :  IF an error
                                0285    489 ;       :  :  THEN
                                0285    490 ;       :  :  Report error
                                0285    491 ;       :  :  Exit test
                                0285    492 ;       :  ENDIF
                                0285    493 ;       ENDSUBTEST PROCESSOR REGISTER 28
                                0285    494 ;
                                0285    495 ;
                                0285    496 ;-
                                0285    497             $DS_BGNSUB
                                0285        T1_S4::
00010030 9F   00000024'EF   FA  0285                        CALLG   $S$, a#DS$BGNSUB
                                0290    498             $DS_SETVEC_S    VECTOR=#SCB$L_ROPRAND   SRVADR=FAULT_SERVICE
                      00    DD  0290                        PUSHL   #0
              0000032C'EF   DF  0292                        PUSHAL  FAULT_SERVICE
                      18    DD  0298                        PUSHL   #SCB$L_ROPRAND
          00010160 9F   03    FB  029A                        CALLS   #3, a#DS$SETVEC
          57  000002BC'EF   9E  02A1    499             MOVAB   RENTRY_7,R7             ; load R7 with address of rentry point
              00000004'EF   94  02A8    500             CLRB    B_FLAGS                 ; initialize error flag
          00000000'EF   28    D0  02AE    501             MOVL    #^X28,L_REG_ADD         ; load reg address for error
          28  00008000 8F   DA  02B5    502             MTPR    #1@15,#PR750$_ACCS      ; turn on FPA (should not fault) 5.2
                                02BC    503 RENTRY_7:
       19 00000004'EF   01    E1  02BC    504             BBC     #V_FAULT,B_FLAGS,3$     ; br = MTPR did not cause fault
                                02C4    505             $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_FAULT_ERR_T
              00000218'8F   DD  02C4                        PUSHL   #T_FAULT_ERR_T
              00000310'EF   DF  02CA                        PUSHAL  ERR_MESSAGE
                      00    DD  02D0                        PUSHL   #0
                      00    DD  02D2                        PUSHL   #0
                      01    DD  02D4                        PUSHL   #$ER
                                02D6        ;;; TEST 1, SUBTEST 4, ERROR 1
          000100D0 9F   05    FB  02D6                        CALLS   #$$M, a#DS$ERRHARD
```

```
                57   000002ED'EF   9E   02DD    506 3$:     MOVAB   RENTRY_8,R7              ; load R7 with address of rentry point
                     00000004'EF   94   02E4    507         CLRB    B_FLAGS                  ; initialize error flag
                         58   28   DB   02EA    508         MFPR    #PR750$_ACCS,R8          ; read FPA type (should not fault) 5.2
                                   02ED    509 RENTRY_8:
             19 00000004'EF   01   E1   02ED    510         BBC     #V_FAULT,B_FLAGS,5$      ; br = MFPR did not cause fault
                                   02F5    511         $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_FAULT_ERR_F
                     00000144'8F   DD   02F5                         PUSHL   #T_FAULT_ERR_F
                     00000310'EF   DF   02FB                         PUSHAL  ERR_MESSAGE
                             00    DD   0301                         PUSHL   #0
                             00    DD   0303                         PUSHL   #0
                             02    DD   0305                         PUSHL   #$ER
                                   0307        ;;; TEST 1, SUBTEST 4, ERROR 2
                000100D0 9F   05   FB   0307                         CALLS   #$$M, a#DS$ERRHARD
                59   00000000'EF   D0   030E    512 5$:     MOVL    KA_PTABLE,R9             ; load address of P TABLE
                      42 A9   58   91   0315    513         CMPB    R8,KA$B_ACC_TYPE(R9)     ; check if type is the same
                             13   13   0319    514         BEQL    7$                       ; br = yes, same type
                                   031B    515         $DS_ERRHARD_S   UNIT=#0,MSGADR=T_FPA_ERR
                             00    DD   031B                         PUSHL   #0
                     00000283'EF   DF   031D                         PUSHAL  T_FPA_ERR
                             00    DD   0323                         PUSHL   #0
                             03    DD   0325                         PUSHL   #$ER
                                   0327        ;;; TEST 1, SUBTEST 4, ERROR 3
                000100D0 9F   04   FB   0327                         CALLS   #$$M, a#DS$ERRHARD
                                   032E    516 7$:     $DS_CLRVEC_S    VECTOR=#SCB$L_ROPRAND
                             18    DD   032E                         PUSHL   #SCB$L_ROPRAND
                00010168 9F   01   FB   0330                         CALLS   #1, a#DS$CLRVEC
                                   0337    517
                                   0337    518         $DS_ENDSUB
                                   0337        T1_S4_X:
      00010038 9F   00000024'EF   FA   0337                         CALLG   $S$, a#DS$ENDSUB
                                   0342    519         $DS_ENDTEST
                         50   01   D0   0342                         MOVL    #1, R0           ; NORMAL EXIT
                                   0345        TEST_001_X::
                00010058 9F   6E   FA   0345                         CALLG   (SP), a#DS$BREAK
                                   04   034C                         RET                      ; RETURN TO TEST SEQUENCER
                                   034D    520         $DS_ENDMOD
                                   00000000                         .PSECT  $TSTCNT, NOEXE, NOWRT, OVR, LONG
                                00000001   0000                         .LONG   $TN
                                   0004    521         .END
```

```
$$$                             = 00000024 R      05
$$ARGS                          = 0000000A
$$E                             = 00000001
$$M                             = 00000004
$$N                             = 00000000
$$S                             = FFFFFFFF
$$T1                            = 0000002C
$ENV                            = 00000001   G
$ER                             = FFFFFFFF
$MO                             = 00000001   G
$S$                             = 00000024 R      05
$ST                             = 00000000
$TN                             = 00000001
ADDRESS_TABLE                     00000005 R      01
ALL                             = 00000009   G
BASE_001                          00000000 R      03
B_FLAGS                           00000004 R      01
CEP_FUNCTIONAL                  = 00000000
CEP_REPAIR                      = 00000001
DATA_001                          00000020 R      03
DEFAULT                         = 00000000   G
DS$ABORT                          00010020
DS$ASKADR                         00010090
DS$ASKDATA                        00010080
DS$ASKLGCL                        00010098
DS$ASKSTR                         000100A0
DS$ASKVLD                         00010088
DS$ATTACH                         000101A8
DS$BGNSUB                         00010030
DS$BRANCH                         000100A8
DS$BREAK                          00010058
DS$CANWAIT                        00010070
DS$CHANNEL                        00010180
DS$CKLOOP                         00010040
DS$CLRVEC                         00010168
DS$CNTRLC                         00010078
DS$CVTREG                         000100B0
DS$ENDPASS                        00010010
DS$ENDSUB                         00010038
DS$ERRDEV                         000100C8
DS$ERRHARD                        000100D0
DS$ERRPREP                        00010108
DS$ERRSOFT                        000100D8
DS$ERRSYS                         000100C0
DS$ESCAPE                         00010050
DS$FREEDBGSYM                     000101B8
DS$GETBUF                         00010120
DS$GETMEM                         00010130
DS$GETTERM                        000101C8
DS$GPHARD                         00010018
DS$HELP                           000101B0
DS$INITSCB                        00010170
DS$INLOOP                         00010048
DS$K_ERROR                      = 00000002
DS$K_NORMAL                     = 00000001
DS$K_SEVERE                     = 00000004
DS$K_SUBSYS                     = 00000066
DS$K_WARNING                    = 00000000
DS$LOAD                           00010198
DS$LOADPCS                        000101C0
DS$MAPDBGBLOCK                    00010118
DS$MEMSIZE                        000101D8
DS$MMOFF                          00010158
DS$MMON                           00010150
DS$MOVPHY                         00010148
DS$MOVVRT                         00010140
DS$PARSE                          000100B8
DS$PRINTB                         000100E0
DS$PRINTF                         000100F0
DS$PRINTS                         000100F8
DS$PRINTSIG                       00010100
DS$PRINTX                         000100E8
DS$PROBE                          000101A0
DS$RELBUF                         00010128
DS$RELMEM                         00010138
DS$SERVICE_DISPATCHER             000101D0
DS$SETIPL                         00010178
DS$SETMAP                         00010188
DS$SETPRIEXV                      00010110
DS$SETVEC                         00010160
DS$SHOCHAN                        00010190
DS$SUMMARY                        00010028
DS$WAITMS                         00010060
DS$WAITUS                         00010068
DS$_ARITH                       = 006600D0
DS$_ASBE                        = 00660118
DS$_BADLINK                     = 006600F0
DS$_BADTYPE                     = 006600E8
DS$_BIIC                        = 00660120
DS$_CHME                        = 006600A8
DS$_CHMK                        = 006600E0
DS$_DEVNAME                     = 00660108
DS$_ERROR                       = 00660002
DS$_FHWE                        = 00660068
DS$_FRAGBUF                     = 00660080
DS$_ICBUSY                      = 006600C8
DS$_ICERR                       = 006600C0
DS$_IHWE                        = 00660060
DS$_ILLCHAR                     = 00660018
DS$_ILLPAGCNT                   = 00660078
DS$_ILLUNIT                     = 00660100
DS$_INSFMEM                     = 00660050
DS$_IPL2HI                      = 006600B8
DS$_IVADDR                      = 00660040
DS$_IVVECT                      = 00660038
DS$_KRNLSTK                     = 00660090
DS$_LOGIC                       = 00660070
DS$_MCHK                        = 00660088
DS$_MMOFF                       = 00660058
DS$_NEEDUNIT                    = 006600F8
```

```
DS$_NODE                        = 00660128
DS$_NOPCS                       = 00660110
DS$_NORMAL                      = 00660001
DS$_NOSUPPORT                   = 006600B1
DS$_NOTDON                      = 00660030
DS$_NOTIMP                      = 006600B0
DS$_NULLSTR                     = 00660010
DS$_OVERFLOW                    = 00660008
DS$_POWER                       = 00660098
DS$_PROGERR                     = 00660020
DS$_SEVERE                      = 00660004
DS$_TRANSL                      = 006600A0
DS$_TRUNCATE                    = 00660028
DS$_UNEXPINT                    = 006600D8
DS$_VASFULL                     = 00660048
DS$_WARNING                     = 00660000
DSA$AL_APTMAIL                    0000FE00
DSA$AT_APTTXT                     0000FA00
DSA$GL_APTCOM                     0000FE04
DSA$GL_DEVLEN                     0000FE58
DSA$GL_ERRNO                      0000FE44
DSA$GL_EVENT                      0000FE48
DSA$GL_FLAGS                      0000FE00
DSA$GL_MSGTYP                     0000FE40
DSA$GL_PASSES                     0000FE08
DSA$GL_PASSNO                     0000FE54
DSA$GL_SECTNO                     0000FE10
DSA$GL_SID                        0000FE14
DSA$GL_SUBTNO                     0000FE4C
DSA$GL_TESTNO                     0000FE50
DSA$GL_UNITS                      0000FE0C
DSA$GQ_MSGPTR                     0000FE68
DSA$GT_DEVNAM                     0000FE5C
ENV$M_DOMAIN                    = 00000002
ENV$M_LEVEL                     = 00000001
ENV$M_SUPER                     = 000003FC
ENV$S_DOMAIN                    = 00000001
ENV$S_LEVEL                     = 00000001
ENV$S_SUPER                     = 00000008
ENV$V_DOMAIN                    = 00000001
ENV$V_LEVEL                     = 00000000
ENV$V_SUPER                     = 00000002
ENV$_CPU                        = 00000000
ENV$_FUNCTIONAL                 = 00000000
ENV$_REPAIR                     = 00000001
ENV$_SUPER                      = 00000001
ENV$_SYSTEM                     = 00000001
ERR$_MSGADR                     = 0000000C
ERR$_NARGS                      = 0000000A
ERR$_NUM                        = 00000004
ERR$_P1                         = 00000014
ERR$_P2                         = 00000018
ERR$_P3                         = 0000001C
ERR$_P4                         = 00000020
ERR$_P5                         = 00000024
ERR$_P6                         = 00000028
ERR$_POINTER                    = 00000010
ERR$_UNIT                       = 00000008
ERR_MESSAGE                       00000310 R      01
FAULT_SERVICE                     0000032C R      01
HALT                            = 00000004  G
HP$A_DEPENDENT                    00000032
HP$A_DEVICE                       00000018
HP$A_DVA                          0000001C
HP$A_LINK                         00000020
HP$B_DRIVE                        0000000B
HP$B_FLAGS                        0000000A
HP$Q_DEVICE                       00000000
HP$T_DEVICE                       0000000C
HP$T_TYPE                         00000026
HP$W_SIZE                         00000008
HP$W_VECTOR                       00000024
IPR                             = 00000006  G
KA$B_ACC_TYPE                     00000042
KA$B_SID_TYPE                     0000003D
KA$K_LEN                          00000043
KA$L_FLAGS                        00000032
KA$L_SID                          0000003A
KA$W_LATENCY                      0000003E
KA$W_PROGRESS                     00000040
KA$W_RESERVED                     00000038
KA$W_WCS                          00000036
KA_PTABLE                         ********    X   03
L_REG_ADD                         00000000 R      01
MANUAL                          = 00000001  G
MCHK                            = 00000005  G
MSG_001                           00000002 R      03
M_FAULT                         = 00000002
M_NO_FAULT                      = 00000001
NEXT                              00000049 R      03
NEXT1                             00000119 R      03
NEXT2                             000001E2 R      03
PAR$M_ATDEF                     = 00000010
PAR$M_ATHI                      = 00000008
PAR$M_ATLO                      = 00000004
PAR$M_NODEF                     = 00000002
PAR$V_ATDEF                     = 00000004
PAR$V_ATHI                      = 00000003
PAR$V_ATLO                      = 00000002
PAR$V_NODEF                     = 00000001
PAR$_BIN                        = 00000002
PAR$_DEC                        = 0000000A
PAR$_HEX                        = 00000010
PAR$_NO                         = 00000000
PAR$_OCT                        = 00000008
PAR$_YES                        = 00000001
PCS                             = 00000008  G
POWER_FAIL                      = 00000003  G
PR750$_ACCS                     = 00000028
PSL$K_EXEC                      = 00000001
```

```
PSL$K_KERNEL                    = 00000000
PSL$K_SUPER                     = 00000002
PSL$K_USER                      = 00000003
PSL$M_CBIT                      = 00000001
PSL$M_NBIT                      = 00000008
PSL$M_VBIT                      = 00000002
PSL$M_ZBIT                      = 00000004
PSL$V_CBIT                      = 00000000
PSL$V_NBIT                      = 00000003
PSL$V_VBIT                      = 00000001
PSL$V_ZBIT                      = 00000002
READ_TABLE                        000000D5 R      01
RENTRY_1                          0000006A R      03
RENTRY_2                          000000A5 R      03
RENTRY_3                          0000013A R      03
RENTRY_4                          0000016B R      03
RENTRY_5                          00000203 R      03
RENTRY_6                          00000234 R      03
RENTRY_7                          000002BC R      03
RENTRY_8                          000002ED R      03
SCB$L_ACCESS                      00000020
SCB$L_ARITH                       00000034
SCB$L_BREAK                       0000002C
SCB$L_CHME                        00000044
SCB$L_CHMK                        00000040
SCB$L_CHMS                        00000048
SCB$L_CHMU                        0000004C
SCB$L_COMPAT                      00000030
SCB$L_KNLSTK                      00000008
SCB$L_MACHCHK                     00000004
SCB$L_OPCCUS                      00000014
SCB$L_OPCDEC                      00000010
SCB$L_POWER                       0000000C
SCB$L_RADRMOD                     0000001C
SCB$L_ROPRAND                     00000018
SCB$L_RXDB                        000000F8
SCB$L_SFTLVL1                     00000084
SCB$L_SFTLVL10                    000000A8
SCB$L_SFTLVL11                    000000AC
SCB$L_SFTLVL12                    000000B0
SCB$L_SFTLVL13                    000000B4
SCB$L_SFTLVL14                    000000B8
SCB$L_SFTLVL15                    000000BC
SCB$L_SFTLVL2                     00000088
SCB$L_SFTLVL3                     0000008C
SCB$L_SFTLVL4                     00000090
SCB$L_SFTLVL5                     00000094
SCB$L_SFTLVL6                     00000098
SCB$L_SFTLVL7                     0000009C
SCB$L_SFTLVL8                     000000A0
SCB$L_SFTLVL9                     000000A4
SCB$L_TBIT                        00000028
SCB$L_TIMER                       000000C0
SCB$L_TRANSL                      00000024
SCB$L_TXDB                        000000FC
SCB$L_ZERO                        00000000
SEP_FUNCTIONAL                  = 00000002
SEP_REPAIR                      = 00000003
SIZ...                          = 00000001
SYS$ALLOC                         00010238
SYS$ASCTIM                        00010248
SYS$ASSIGN                        00010250
SYS$BINTIM                        00010258
SYS$CANCEL                        00010260
SYS$CANTIM                        00010268
SYS$CLOSE                         000105B8
SYS$CLREF                         00010298
SYS$CONNECT                       000105C0
SYS$DALLOC                        000102D8
SYS$DASSGN                        000102E0
SYS$DISCONNECT                    000105D0
SYS$FAO                           00010350
SYS$FAOL                          00010358
SYS$GET                           00010580
SYS$GETCHN                        000104C8
SYS$GETTIM                        00010378
SYS$LKWSET                        000103A0
SYS$NUMTIM                        000103B8
SYS$OPEN                          00010608
SYS$QIO                           000103C8
SYS$QIOW                          00010200
SYS$READ                          00010590
SYS$READEF                        000103D0
SYS$SETAST                        000103F8
SYS$SETEF                         00010400
SYS$SETIMR                        00010420
SYS$SETPRI                        00010428
SYS$SETPRT                        00010430
SYS$SETRWM                        00010438
SYS$SETSWM                        00010448
SYS$ULKPAG                        00010460
SYS$ULWSET                        00010468
SYS$UNWIND                        00010470
SYS$WAITFR                        00010478
SYS$WFLAND                        00010488
SYS$WFLOR                         00010490
T1_S1                             00000026 RG     03
T1_S1_X                           000000EB R      03
T1_S2                             000000F6 RG     03
T1_S2_X                           000001A3 R      03
T1_S3                             000001AE RG     03
T1_S3_X                           0000027A R      03
T1_S4                             00000285 RG     03
T1_S4_X                           00000337 R      03
TEST_001                          00000024 RG     03
TEST_001_X                        00000345 RG     03
TU58                            = 00000002  G
T_FAULT_ERR_F                     00000144 R      01
T_FAULT_ERR_T                     00000218 R      01
T_FPA_ERR                         00000283 R      01
```

```
T_NO_FAULT_FROM                   000001AF R      01
T_NO_FAULT_TO                     000000DD R      01
T_REG_ADD                         000002EA R      01
V_FAULT                         = 00000001
V_NO_FAULT                      = 00000000
WCS                             = 00000007  G
WRITE_TABLE                       000000C9 R      01
```

Psect synopsis

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
ECKAXA	00000335 (821.)	01 (1.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
ABS	00010610 (67088.)	02 (2.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE
TEST_001	0000034D (845.)	03 (3.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
DISPATCH	00000018 (24.)	04 (4.)	NOPIC USR CON REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG
ARGLIST	00000030 (48.)	05 (5.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC LONG
$TSTCNT	00000004 (4.)	06 (6.)	NOPIC USR OVR REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG

Symbol Cross Reference

SYMBOL	VALUE	DEFINITION	REFERENCES...
$$$	=00000024-R	497 (10)	294 (7) 367 (8) 432 (9) 497 (10)
$$ARGS	=0000000A	99 (2)	99 (2)
$$E	=00000001	497 (10)	324 (7) 390 (8) 460 (9) 518 (10)
$$M	=00000004	515 (10)	254 (6) 305 (7) 313 (7) 378 (8) 384 (8) 444 (9) 450 (9) 505 (10) 511 (10) 515 (10)
$$N	=00000000	515 (10)	100 (2) #-221 (4) 222 (4) 305 (7) 313 (7) 378 (8) 384 (8) 444 (9) 450 (9) 505 (10) 511 (10) 515 (10)
$$S	=FFFFFFFF	519 (10)	240 (6) 254 (6) 258 (7) 294 (7) 328 (8) 367 (8) 394 (9) 432 (9) 464 (10) 497 (10)
$$T1	=0000002C	99 (2)	99 (2)
$ENV	=00000001	73 (2)	
$ER	=FFFFFFFF	519 (10)	294 (7) #-305 (7) #-313 (7) 367 (8) #-378 (8) #-384 (8) 432 (9) #-444 (9) #-450 (9) 497 (10) #-505 (10) #-511 (10) #-515 (10)
$MO	=00000001	520 (10)	520 (10)
S	=00000024-R	497 (10)	294 (7) 324 (7) 367 (8) 390 (8) 432 (9) 460 (9) 497 (10) 518 (10)
$ST	=00000000	519 (10)	254 (6) 258 (7) 294 (7) 305 (7) 313 (7) 324 (7) 328 (8) 367 (8) 378 (8) 384 (8) 390 (8) 394 (9) 432 (9) 444 (9) 450 (9) 460 (9) 464 (10) 497 (10) 505 (10) 511 (10) 515 (10) 518 (10) 519 (10)
$TN	=00000001	520 (10)	240 (6) 254 (6) 258 (7) 305 (7) 313 (7) 328 (8) 378 (8) 384 (8) 394 (9) 444 (9) 450 (9) 464 (10) 505 (10) 511 (10) 515 (10) 519 (10) 520 (10)
ADDRESS_TABLE	00000005-R	123 (3)	296 (7)
ALL	=00000009	100 (2)	254 (6)
BASE_001	00000000-R	240 (6)	254 (6)
BIT...	=00000011	94 (2)	73 (2) 89 (2) 90 (2) 94 (2)
B_FLAGS	00000004-R	107 (2)	#-235 (5) #-298 (7) #-302 (7) 304 (7) #-307 (7) #-310 (7) 312 (7) #-373 (8) #-375 (8) 377 (8) #-380 (8) 383 (8) #-439 (9) #-441 (9) 443 (9) #-446 (9) 449 (9) #-500 (10) 504 (10) #-507 (10) 510 (10)
CEP_FUNCTIONAL	=00000000	73 (2)	
CEP_REPAIR	=00000001	73 (2)	73 (2)
DATA_001	00000020-R	254 (6)	254 (6)
DEFAULT	=00000000	100 (2)	254 (6)
DS$BGNSUB	00010030		294 (7) 367 (8) 432 (9) 497 (10)
DS$BREAK	00010058		519 (10)

```
DS$CLRVEC                       00010168                        322     (7)     389     (8)     459     (9)     516     (10)
DS$ENDSUB                       00010038                        324     (7)     390     (8)     460     (9)     518     (10)
DS$ERRHARD                      000100D0                        305     (7)     313     (7)     378     (8)     384     (8)
                                                                444     (9)     450     (9)     505     (10)    511     (10)
                                                                515     (10)
DS$K_ERROR                      =00000002       94      (2)
DS$K_NORMAL                     =00000001       94      (2)
DS$K_SEVERE                     =00000004       94      (2)
DS$K_SUBSYS                     =00000066       94      (2)     94      (2)
DS$K_WARNING                    =00000000       94      (2)
DS$PRINTB                       0001C0E0                        221     (4)     222     (4)
DS$SETVEC                       00010160                        295     (7)     369     (8)     433     (9)     435     (9)
                                                                498     (10)
DS$_ARITH                       =006600D0       94      (2)
DS$_ASBE                        =00660118       94      (2)
DS$_BADLINK                     =006600F0       94      (2)
DS$_BADTYPE                     =006600E8       94      (2)
DS$_BIIC                        =00660120       94      (2)
DS$_CHME                        =006600A8       94      (2)
DS$_CHMK                        =006600E0       94      (2)
DS$_DEVNAME                     =00660108       94      (2)
DS$_ERROR                       =00660002       94      (2)
DS$_FHWE                        =00660068       94      (2)
DS$_FRAGBUF                     =00660080       94      (2)
DS$_ICBUSY                      =006600C8       94      (2)
DS$_ICERR                       =006600C0       94      (2)
DS$_IHWE                        =00660060       94      (2)
DS$_ILLCHAR                     =00660018       94      (2)
DS$_ILLPAGCNT                   =00660078       94      (2)
DS$_ILLUNIT                     =00660100       94      (2)
DS$_INSFMEM                     =00660050       94      (2)
DS$_IPL2HI                      =006600B8       94      (2)
DS$_IVADDR                      =00660040       94      (2)
DS$_IVVECT                      =00660038       94      (2)
DS$_KRNLSTK                     =00660090       94      (2)
DS$_LOGIC                       =00660070       94      (2)
DS$_MCHK                        =00660088       94      (2)
DS$_MMOFF                       =00660058       94      (2)
DS$_NEEDUNIT                    =006600F8       94      (2)
DS$_NODE                        =00660128       94      (2)
DS$_NOPCS                       =00660110       94      (2)
DS$_NORMAL                      =00660001       94      (2)
DS$_NOSUPPORT                   =006600B1       94      (2)
DS$_NOTDON                      =00660030       94      (2)
DS$_NOTIMP                      =006600B0       94      (2)     94      (2)
DS$_NULLSTR                     =00660010       94      (2)
DS$_OVERFLOW                    =00660008       94      (2)
DS$_POWER                       =00660098       94      (2)
DS$_PROGERR                     =00660020       94      (2)
DS$_SEVERE                      =00660004       94      (2)
DS$_TRANSL                      =006600A0       94      (2)
DS$_TRUNCATE                    =00660028       94      (2)
DS$_UNEXPINT                    =006600D8       94      (2)
DS$_VASFULL                     =00660048       94      (2)
DS$_WARNING                     =00660000       94      (2)     94      (2)
```

```
DSA$GL_SID                       0000FE14                    #-316    (7)    #-453    (9)
ENV$M_DOMAIN                    =00000002      73    (2)
ENV$M_LEVEL                     =00000001      73    (2)
ENV$M_SUPER                     =000003FC      73    (2)
ENV$S_DOMAIN                    =00000001      73    (2)
ENV$S_LEVEL                     =00000001      73    (2)
ENV$S_SUPER                     =00000008      73    (2)
ENV$V_DOMAIN                    =00000001      73    (2)      73    (2)
ENV$V_LEVEL                     =00000000      73    (2)      73    (2)
ENV$V_SUPER                     =00000002      73    (2)
ENV$_CPU                        =00000000      73    (2)      73    (2)
ENV$_FUNCTIONAL                 =00000000      73    (2)      73    (2)
ENV$_REPAIR                     =00000001      73    (2)      73    (2)
ENV$_SUPER                      =00000001      73    (2)
ENV$_SYSTEM                     =00000001      73    (2)      73    (2)
ERR$_MSGADR                     =0000000C      99    (2)
ERR$_NARGS                      =0000000A      99    (2)
ERR$_NUM                        =00000004      99    (2)
ERR$_P1                         =00000014      99    (2)      221   (4)
ERR$_P2                         =00000018      99    (2)
ERR$_P3                         =0000001C      99    (2)
ERR$_P4                         =00000020      99    (2)
ERR$_P5                         =00000024      99    (2)
ERR$_P6                         =00000028      99    (2)
ERR$_POINTER                    =00000010      99    (2)
ERR$_UNIT                       =00000008      99    (2)
ERR_MESSAGE                      00000310-R    219   (4)      305   (7)    313    (7)    378    (8)    384    (8)
                                                              444   (9)    450    (9)    505    (10)   511    (10)
FAULT_SERVICE                    0000032C-R    233   (5)      295   (7)    369    (8)    433    (9)    435    (9)
                                                              498   (10)
HALT                            =00000004      100   (2)
IPR                             =00000006      100   (2)      254   (6)
KA$B_ACC_TYPE                    00000042                    #-513   (10)
KA_PTABLE                        00000000-XR                 #-512   (10)
L_REG_ADD                        00000000-R    106   (2)      #-222   (4)    #-300    (7)    #-371    (8)    #-437    (9)
                                                              #-501   (10)
MANUAL                          =00000001      100   (2)
MCHK                            =00000005      100   (2)
MSG_001                          00000002-R    240   (6)      254   (6)
M_FAULT                         =00000002      112   (2)      #-235   (5)
M_NO_FAULT                      =00000001      110   (2)      #-302   (7)    #-310    (7)    #-375    (8)    #-441    (9)
NEXT                             00000049-R    297   (7)      #-321   (7)
NEXT1                            00000119-R    370   (8)      #-388   (8)
NEXT2                            000001E2-R    436   (9)      #-458   (9)
PAR$M_ATDEF                     =00000010      89    (2)
PAR$M_ATHI                      =00000008      89    (2)
PAR$M_ATLO                      =00000004      89    (2)
PAR$M_NODEF                     =00000002      89    (2)
PAR$V_ATDEF                     =00000004      89    (2)
PAR$V_ATHI                      =00000003      89    (2)
PAR$V_ATLO                      =00000002      89    (2)
PAR$V_NODEF                     =00000001      89    (2)
PAR$_BIN                        =00000002      89    (2)
PAR$_DEC                        =0000000A      89    (2)
PAR$_HEX                        =00000010      89    (2)
```

```
PAR$_NO                         =00000000     89      (2)
PAR$_OCT                        =00000008     89      (2)
PAR$_YES                        =00000001     89      (2)
PCS                             =00000008     100     (2)
POWER_FAIL                      =00000003     100     (2)
PR750$_ACCS                     =00000028                     #-502     (10)    #-508     (10)
PSL$K_EXEC                      =00000001     90      (2)
PSL$K_KERNEL                    =00000000     90      (2)
PSL$K_SUPER                     =00000002     90      (2)
PSL$K_USER                      =00000003     90      (2)
PSL$M_CBIT                      =00000001     90      (2)
PSL$M_NBIT                      =00000008     90      (2)
PSL$M_VBIT                      =00000002     90      (2)
PSL$M_ZBIT                      =00000004     90      (2)
PSL$V_CBIT                      =00000000     90      (2)
PSL$V_NBIT                      =00000003     90      (2)
PSL$V_VBIT                      =00000001     90      (2)
PSL$V_ZBIT                      =00000002     90      (2)
READ_TABLE                       000000D5-R   186     (3)       368     (8)
RENTRY_1                         0000006A-R   303     (7)       297     (7)
RENTRY_2                         000000A5-R   311     (7)       306     (7)
RENTRY_3                         0000013A-R   376     (8)       372     (8)
RENTRY_4                         0000016B-R   382     (8)       379     (8)
RENTRY_5                         00000203-R   442     (9)       438     (9)
RENTRY_6                         00000234-R   448     (9)       445     (9)
RENTRY_7                         000002BC-R   503     (10)      499     (10)
RENTRY_8                         000002ED-R   509     (10)      506     (10)
SCB$L_ROPRAND                    00000018                      #-295     (7)     #-322     (7)     #-369     (8)     #-389     (8)
                                                               #-433     (9)     #-435     (9)     #-459     (9)     #-498     (10)
                                                               #-516     (10)
SEP_FUNCTIONAL                  =00000002     73      (2)
SEP_REPAIR                      =00000003     73      (2)
SIZ...                          =00000001     90      (2)       73      (2)       89      (2)       90      (2)
T1_S1                            00000026-R   294     (7)
T1_S1_X                          000000EB-R   324     (7)
T1_S2                            000000F6-R   367     (8)
T1_S2_X                          000001A3-R   390     (8)
T1_S3                            000001AE-R   432     (9)
T1_S3_X                          0000027A-R   460     (9)
T1_S4                            00000285-R   497     (10)
T1_S4_X                          00000337-R   518     (10)
TEST_001                         00000024-R   254     (6)       254     (6)
TEST_001_X                       00000345-R   519     (10)
TU58                            =00000002     100     (2)
T_FAULT_ERR_F                    00000144-R   199     (4)     #-384     (8)     #-511     (10)
T_FAULT_ERR_T                    00000218-R   207     (4)     #-450     (9)     #-505     (10)
T_FPA_ERR                        00000283-R   211     (4)       515     (10)
T_NO_FAULT_FROM                  000001AF-R   203     (4)     #-313     (7)
T_NO_FAULT_TO                    000000DD-R   195     (4)     #-305     (7)     #-378     (8)     #-444     (9)
T_REG_ADD                        000002EA-R   215     (4)       222     (4)
V_FAULT                         =00000001     111     (2)     #-383     (8)     #-449     (9)     #-504     (10)    #-510     (10)
V_NO_FAULT                      =00000000     109     (2)     #-304     (7)     #-312     (7)     #-377     (8)     #-443     (9)
WCS                             =00000007     100     (2)
WRITE_TABLE                      000000C9-R   177     (3)       434     (9)
```

Macros Cross Reference

MACRO	SIZE	DEFINITION	REFERENCES...
$D1_BSUBT	1	294 (7)	294 (7) 367 (8) 432 (9) 497 (10)
$D1_BTEST	1	254 (6)	254 (6)
$D1_ERR	1	305 (7)	305 (7) 313 (7) 378 (8) 384 (8) 444 (9)
			450 (9) 505 (10) 511 (10) 515 (10)
$D1_ERR_S	1	305 (7)	305 (7) 313 (7) 378 (8) 384 (8) 444 (9)
			450 (9) 505 (10) 511 (10) 515 (10)
$D1_ESUBT	1	324 (7)	324 (7) 390 (8) 460 (9) 518 (10)
$D1_ETEST	1	519 (10)	519 (10)
$D1_PRINT_S	1	221 (4)	221 (4) 222 (4)
$D1_SBTTL	2	240 (6)	240 (6) 258 (7) 328 (8) 394 (9) 464 (10)
$D2_BDATA	1	254 (6)	254 (6)
$D2_BTEST	1	254 (6)	254 (6)
$D2_SBTTL	1	240 (6)	240 (6)
$DEF	1	94 (2)	
$DEFINI	1	90 (2)	90 (2) 91 (2) 92 (2) 93 (2) 95 (2)
			96 (2) 97 (2) 98 (2)
$DS_BGNMESSAGE	1	220 (4)	220 (4)
$DS_BGNMOD	1	73 (2)	73 (2)
$DS_BGNSUB	1	294 (7)	294 (7) 367 (8) 432 (9) 497 (10)
$DS_BGNTEST	1	254 (6)	254 (6)
$DS_BREAK	1	519 (10)	519 (10)
$DS_CLRVEC_S	1	322 (7)	322 (7) 389 (8) 459 (9) 516 (10)
$DS_DSADEF	5	95 (2)	95 (2)
$DS_DSDEF	2	94 (2)	94 (2)
$DS_DSSDEF	8	96 (2)	96 (2)
$DS_ENDDATA	1	254 (6)	254 (6)
$DS_ENDMESSAGE	1	223 (4)	223 (4)
$DS_ENDMOD	1	520 (10)	520 (10)
$DS_ENDSUB	1	324 (7)	324 (7) 390 (8) 460 (9) 518 (10)
$DS_ENDTEST	1	519 (10)	519 (10)
$DS_ENVDEF	2	73 (2)	73 (2)
$DS_ERRDEF	1	99 (2)	99 (2)
$DS_ERRHARD_S	1	305 (7)	305 (7) 313 (7) 378 (8) 384 (8) 444 (9)
			450 (9) 505 (10) 511 (10) 515 (10)
$DS_HPODEF	2	97 (2)	97 (2)
$DS_PAGE	1	238 (5)	238 (5) 256 (6) 326 (7) 392 (8) 462 (9)
$DS_PARDEF	1	89 (2)	89 (2)
$DS_PRINTB_S	1	221 (4)	221 (4) 222 (4)
$DS_PSLDEF	1	90 (2)	90 (2)
$DS_SBTTL	1	240 (6)	240 (6) 258 (7) 328 (8) 394 (9) 464 (10)
$DS_SCBDEF	3	93 (2)	93 (2)
$DS_SECDEF	1	100 (2)	100 (2)
$DS_SETVEC_S	1	295 (7)	295 (7) 369 (8) 433 (9) 435 (9) 498 (10)
$EQU	1	94 (2)	73 (2) 89 (2) 90 (2) 94 (2)
$EQULS1	1	94 (2)	73 (2) 90 (2) 94 (2)
$EQULST	1	73 (2)	73 (2) 90 (2) 94 (2)
$GBLINI	2	73 (2)	73 (2) 89 (2) 90 (2) 94 (2)
$OFFDEF	1	99 (2)	99 (2)

$PR750DEF	1	92	(2)	92	(2)								
$PRDEF	4	91	(2)	91	(2)								
$PSLDEF	2	90	(2)	90	(2)								
$PUSHADR	1	305	(7)	305	(7)	313	(7)	378	(8)	384	(8)	444	(9)
				450	(9)	505	(10)	511	(10)	515	(10)		
$VIELD	1	73	(2)	73	(2)	89	(2)	90	(2)				
$VIELD1	1	94	(2)	73	(2)	89	(2)	90	(2)				
ECKAX_SECDEF	1	100	(2)	100	(2)								
KA_DEF	2	98	(2)	98	(2)								

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	111	00:00:00.38	00:00:03.77
Command processing	880	00:00:00.95	00:00:04.65
Pass 1	558	00:00:16.03	00:00:37.62
Symbol table sort	0	00:00:00.81	00:00:00.93
Pass 2	8	00:00:02.93	00:00:05.24
Symbol table output	2	00:00:00.24	00:00:01.10
Psect synopsis output	0	00:00:00.04	00:00:00.04
Cross-reference output	6	00:00:01.03	00:00:03.19
Assembler run totals	1566	00:00:22.43	00:00:56.69

The working set limit was 2912 pages.
118261 bytes (231 pages) of virtual memory were used to buffer the intermediate code.
There were 30 pages of symbol table space allocated to hold 564 non-local and 14 local symbols.
521 source lines were read in Pass 1, producing 25 object records in Pass 2.
125 pages of virtual memory were used to define 49 macros.

Macro library statistics

Macro library name	Macros defined
DISK$DIAGPACK02:[TAYLOR.ECKAX]ECKAX.MLB;1	2
SYS$COMMON:[SYSLIB]DIAG.MLB;955	37
SYS$COMMON:[SYSLIB]STARLET.MLB;1	10
TOTALS (all libraries)	49

933 GETS were required to define 49 macros.

There were no errors, warnings or information messages.

```
MACRO/LIS=ECKAX2.LIS/CROSS ECKAX2
```

Table of contents

(1)	1	ECKAX3: POWER FAIL
(3)	67	DECLARATIONS
(4)	131	INSTRUCTION MESSAGES
(4)	189	ERROR MESSAGES
(5)	235	SUBROUTINES
(6)	359	TEST 2: POWER FAIL (INIT SWITCH)
(7)	393	SUBTEST 2.1: GOOD RPB SUBTEST
(8)	449	SUBTEST 2.2: BAD CHECKSUM SUBTEST
(9)	508	SUBTEST 2.3: SEARCH FOR GOOD RPB
(10)	570	SUBTEST 2.4: WARM START FLAG SUBTEST
(11)	628	TEST 3: POWER FAIL (BREAKER)
(12)	658	SUBTEST 3.1: GOOD RPB SUBTEST
(13)	715	SUBTEST 3.2: BAD CHECKSUM SUBTEST
(14)	775	SUBTEST 3.3: SEARCH FOR GOOD RPB
(15)	838	SUBTEST 3.4: WARM START FLAG SUBTEST

```
0000     1          .SBTTL  ECKAX3: POWER FAIL
0000     2          .TITLE  ECKAX3  VAX-11/750 Specific CPU Cluster Exerciser
0000     3          .IDENT  /5.2/
0000     4
0000     5 ;
0000     6 ; Copyright (C) 1980,1983,1986
0000     7 ; Digital Equipment Corporation, Maynard, Massachusetts 01754
0000     8 ;
0000     9 ; This software is furnished  under a license for use only on a single
0000    10 ; computer  system and  may be  copied only with  the inclusion of the
0000    11 ; above copyright notice.  This software, or any other copies thereof,
0000    12 ; may not be provided or  otherwise made available to any other person
0000    13 ; except for use on such system and to one who agrees to these license
0000    14 ; terms.  Title to and  ownership of the  software  shall at all times
0000    15 ; remain in DEC.
0000    16 ;
0000    17 ; The information in this software is subject to change without notice
0000    18 ; and should  not be construed  as a commitment  by Digital  Equipment
0000    19 ; Corporation.
0000    20 ;
0000    21 ; DEC assumes  no  responsibility  for  the use or  reliability of its
0000    22 ; software on equipment which is not supplied by DEC.
0000    23 ;
0000    24
0000    25 ;++
0000    26 ; Facility:     VAX Architecture Diagnostic.
0000    27 ;
0000    28 ; Abstract:     This module tests that the VAX-11/750 power failure and
0000    29 ;               recovery mechanism functions properly.  The power fail
0000    30 ;               tests instruct the operator to select console pannel switch
0000    31 ;               settings and force various power interruptions.
0000    32 ;
0000    33 ;
0000    34 ; Environment:  VAX Diagnostic Supervisor.
0000    35 ;
0000    36 ; Author:       Fred Roemer     19-Feb-81       Version 2.0
0000    37 ;
0000    38 ;       NO CHANGES TO THIS MODULE FOR VERSION 3.3 (DOCUMENT CHANGE ONLY)
0000    39 ;
0000    40 ;
0000    41 ;       Dan Milleville  19-Mar-82               Version 3.4
0000    42 ;       Changed Test 3 exit code to accomodate temporarily a hardware problem.
0000    43 ;
0000    44 ;       Dave Shull      30-Nov-82               Version 4.0
0000    45 ;       Added tests 13 and 14 for coverage of PCS module.
0000    46 ;
0000    47 ;       Tai-Chun Pan    04-Mar-83               Version 5.0
0000    48 ;       Added test 5 for coverage of Processor Halts Architecture Undefined.
0000    49 ;       Added tests 11 and 12 for coverage of new ROM with MRSP of TU58.
0000    50 ;
0000    51 ;       Dan Milleville  21-Nov-83               Version 5.1
0000    52 ;       Fixed error in timer routine (didn't turn off timer).
0000    53 ;
0000    54 ;       Wayne R. Taylor February 1986           Version 5.2
0000    55 ;       Redefined IPR's to jive with starlet.
```

```
0000     56 ;       Modified the code for problem report Eckax5 where:
0000     57 ;               Tests 6 & 13 tests with cache off.
0000     58 ;               Subtest 1 does not check bit 0 of the memory under test.
0000     59 ;               Subtest 4 tests row 0, 1, 2, but not row 3.
0000     60 ;       Indicate to user if the operator flag is not for tests 2 through 5.
0000     61 ;       Modifications were supplied by the submitter.
0000     62 ;       Search on 5.2.
0000     63 ;
0000     64 ;--
```

```
                     0000     66
                     0000     67          .SBTTL  DECLARATIONS
                     0000     68          .LIST   MEB
                     0000     69          .NLIST  CND
                  00000000    70          .PSECT  ECKAXC, PAGE, NOWRT
                     0000     71          .LIBRARY        "SYS$LIBRARY:DIAG"; VAX family diagnostic library.
                     0000     72          $DS_BGNMOD      CEP_REPAIR, TN=2
                     0000        ;;;      Macro-32 Diagnostic macro library Version 8.3 "DIAG.MLB (245)"
                     0000     73
                     0000     74 ;
                     0000     75 ; Include files:
                     0000     76 ;
                     0000     77
                     0000     78          .LIBRARY        "ECKAX"         ; CPU Cluster Exerciser library.
                     0000     79
                     0000     80 ;
                     0000     81 ; Macros:
                     0000     82 ;
                     0000     83
                     0000     84          $DS_SCBDEF
                     0000     85          $DS_DSDEF
                     0000     86          $DS_DSSDEF
                     0000     87          $DS_PSLDEF
                     0000                 .SAVE   LOCAL_BLOCK
                     0000                 .PSECT  $ABS$,ABS
            00000000  0610               .=0
                  00000000               .RESTORE
                     0000     88          $DS_PARDEF
                     0000     89          $DS_DSADEF
                     0000     90
                     0000     91          ECKAX_SECDEF
                     0000     92
                     0000     93
                     0000     94 ;
                     0000     95 ; Own storage:
                     0000     96 ;
                     0000     97
            00000004 0000     98 L_BUF_BEGIN:     .BLKL   1       ; address of data stored on power failure
            00000008 0004     99 L_COUNT:         .BLKL   1       ; counter
            0000000C 0008    100 L_CHECKSUM:      .BLKL   1       ; contains good RPB checksum
            00000010 000C    101 L_PSL:           .BLKL   1       ; used to store PSL
            00000014 0010    102 L_IS_SP:         .BLKL   1       ; used to store interrupt SP
            00000018 0014    103 L_KS_SP:         .BLKL   1       ; used to store kernel SP
                     0018    104
            00000019 0018    105 B_RESPONCE:      .BLKB   1       ; message responce byte
            0000001A 0019    106 B_FLAGS:         .BLKB   1       ; byte to keep power up and down done flags
            0000001B 001A    107 B_FLAGS2:        .BLKB   1       ; byte to keep stack and mode flags
                     001B    108
                     001B    109
            00000000 001B    110 V_PWRDN_DONE=0                   ; power down done position in flags
            00000001 001B    111 M_PWRDN_DONE=1@0                 ; power down done mask in flags
            00000001 001B    112 V_PWRUP_DONE=1                   ; power up done position in flags
            00000002 001B    113 M_PWRUP_DONE=1@1                 ; power up done mask in flags
            00000002 001B    114 V_BAD_PC=2                       ; incorrect pc position in flags
            00000004 001B    115 M_BAD_PC=1@2                     ; incorrect pc mask in flags
```

```
                    001B   116
          00000000  001B   117 V_BADMODE_DN=0                  ; bad mode on power down position in flags2
          00000001  001B   118 M_BADMODE_DN=1@0                ; bad mode on power down mask in flags2
          00000001  001B   119 V_BADMODE_UP=1                  ; bad mode on power up position in flags2
          00000002  001B   120 M_BADMODE_UP=1@1                ; bad mode on power up mask in flags2
          00000002  001B   121 V_BADSTACK_DN=2                 ; bad stack on power down position in flags2
          00000004  001B   122 M_BADSTACK_DN=1@2               ; bad stack on power down mask in flags2
          00000003  001B   123 V_BADSTACK_UP=3                 ; bad stack on power up position in flags2
          00000008  001B   124 M_BADSTACK_UP=1@3               ; bad stack on power up mask in flags2
                    001B   125
                    001B   126
   000009CC'9F   17 001B   127 JUMP:   JMP     @#POWER_UP      ; used to load instruction at loc 100 to
                    0021   128                                 ; restart from subtests which halt
          00000100  0021   129 STRTUP=^X100                    ; label for loc 100
```

```
                                        0021    131 .SBTTL  INSTRUCTION MESSAGES
                                        0021    132 ;-----------------------------------------------------------------------
                                        0021    133 T_INST:
6F 63 20 65 72 6F 66 65 42 2F 21 00'    0021    134         .ASCIC  "!/Before continuing, set the front panel switch to HALT/RESTART!/"
65 73 20 2C 67 6E 69 75 6E 69 74 6E     002D
20 74 6E 6F 72 66 20 65 68 74 20 74     0039
68 63 74 69 77 73 20 6C 65 6E 61 70     0045
53 45 52 2F 54 4C 41 48 20 6F 74 20     0051
                  2F 21 54 52 41 54     005D
                                  41    0021
                                        0063    135
                                        0063    136 ;-----------------------------------------------------------------------
                                        0063    137 T_MESSAGE_1:
74 73 65 52 20 64 6F 6F 47 2F 21 00'    0063    138         .ASCIC  "!/Good Restart Parameter Block Subtest - This subtest!/"-
65 74 65 6D 61 72 61 50 20 74 72 61     006F
74 62 75 53 20 6B 63 6F 6C 42 20 72     007B
73 20 73 69 68 54 20 2D 20 74 73 65     0087
6C 6C 69 77 2F 21 74 73 65 74 62 75     0093
73 74 69 20 74 72 61 74 73 65 72 20     009F
52 20 65 68 74 20 66 69 20 66 6C 65     00AB
72 65 70 6F 72 70 20 73 69 20 42 50     00B7
74 65 72 70 72 65 74 6E 69 20 79 6C     00C3
                        2F 21 2E 64 65  00CF
                                        00D4    139                 "will restart itself if the RPB is properly interpreted.!/"-
69 6E 69 20 65 68 74 20 68 73 75 50     00D4    140                 "Push the init switch to power fail..."
20 6F 74 20 68 63 74 69 77 73 20 74     00E0
2E 2E 6C 69 61 66 20 72 65 77 6F 70     00EC
                                  2E    00F8
                                  95    0063
                                        00F9    141 ;-----------------------------------------------------------------------
                                        00F9    142 T_MESSAGE_2:
6B 63 65 68 43 20 64 61 42 2F 21 00'    00F9    143         .ASCIC  "!/Bad Checksum Subtest - This subtest will halt the processor!/"-
20 74 73 65 74 62 75 53 20 6D 75 73     0105
65 74 62 75 73 20 73 69 68 54 20 2D     0111
74 6C 61 68 20 6C 6C 69 77 20 74 73     011D
73 73 65 63 6F 72 70 20 65 68 74 20     0129
                        2F 21 72 6F     0135
20 74 6C 61 68 20 61 20 68 74 69 77     0139    144                 "with a halt code of 11. After this has happened the subtest!/"-
20 2E 31 31 20 66 6F 20 65 64 6F 63     0145
68 20 73 69 68 74 20 72 65 74 66 41     0151
20 64 65 6E 65 70 70 61 68 20 73 61     015D
21 74 73 65 74 62 75 73 20 65 68 74     0169
                                  2F    0175
64 65 74 72 61 74 73 65 72 20 73 69     0176    145                 "is restarted by typing S 100 <CR> on the console terminal.!/"-
53 20 67 6E 69 70 79 74 20 79 62 20     0182
6E 6F 20 3E 52 43 3C 20 30 30 31 20     018E
65 6C 6F 73 6E 6F 63 20 65 68 74 20     019A
2F 21 2E 6C 61 6E 69 6D 72 65 74 20     01A6
69 6E 69 20 65 68 74 20 68 73 75 50     01B2    146                 "Push the init switch to power fail...!/"
20 6F 74 20 68 63 74 69 77 73 20 74     01BE
2E 2E 6C 69 61 66 20 72 65 77 6F 70     01CA
                              2F 21 2E  01D6
                                  DF    00F9
                                        01D9    147 ;-----------------------------------------------------------------------
                                        01D9    148 T_MESSAGE_3:
```

```
6F 66 20 68 63 72 61 65 53 2F 21 00'  01D9    149          .ASCIC  "!/Search for Good RPB - This subtest will restart itself!/"-
2D 20 42 50 52 20 64 6F 6F 47 20 72   01E5
73 65 74 62 75 73 20 73 69 68 54 20   01F1
61 74 73 65 72 20 6C 6C 69 77 20 74   01FD
   2F 21 66 6C 65 73 74 69 20 74 72   0209
20 64 6F 6F 67 20 65 68 74 20 66 69   0214    150                  "if the good RPB is found and interpreted properly.!/"-
64 6E 75 6F 66 20 73 69 20 42 50 52   0220
72 70 72 65 74 6E 69 20 64 6E 61 20   022C
6C 72 65 70 6F 72 70 20 64 65 74 65   0238
                        2F 21 2E 79   0244
69 6E 69 20 65 68 74 20 68 73 75 50   0248    151                  "Push the init switch to power fail..."
20 6F 74 20 68 63 74 69 77 73 20 74   0254
2E 2E 6C 69 61 66 20 72 65 77 6F 70   0260
                                 2E   026C
                                 93   01D9
                                      026D    152 ;-----------------------------------------------------------------
                                      026D    153 T_MESSAGE_4:
74 53 20 6D 72 61 57 2F 21 2F 21 00'  026D    154          .ASCIC  "!/!/Warm Start Flag Subtest - This subtest will halt the processo -
cont> r!/"-
62 75 53 20 67 61 6C 46 20 74 72 61   0279
20 73 69 68 54 20 2D 20 74 73 65 74   0285
6C 6C 69 77 20 74 73 65 74 62 75 73   0291
72 70 20 65 68 74 20 74 6C 61 68 20   029D
         2F 21 72 6F 73 73 65 63 6F   02A9
20 74 6C 61 68 20 61 20 68 74 69 77   02B2    155                  "with a halt code of 12. After this has happened the subtest!/"-
20 2E 32 31 20 66 6F 20 65 64 6F 63   02BE
68 20 73 69 68 74 20 72 65 74 66 41   02CA
20 64 65 6E 65 70 70 61 68 20 73 61   02D6
21 74 73 65 74 62 75 73 20 65 68 74   02E2
                                 2F   02EE
64 65 74 72 61 74 73 65 72 20 73 69   02EF    156                  "is restarted by typing S 100 <CR> on the console terminal.!/"-
53 20 67 6E 69 70 79 74 20 79 62 20   02FB
6E 6F 20 3E 52 43 3C 20 30 30 31 20   0307
65 6C 6F 73 6E 6F 63 20 65 68 74 20   0313
2F 21 2E 6C 61 6E 69 6D 72 65 74 20   031F
69 6E 69 20 65 68 74 20 68 73 75 50   032B    157                  "Push the init switch to power fail...!/"
20 6F 74 20 68 63 74 69 77 73 20 74   0337
2E 2E 6C 69 61 66 20 72 65 77 6F 70   0343
                        2F 21 2E 64   034F
                                 E4   026D
                                      0352    158 ;-----------------------------------------------------------------
                                      0352    159 T_MESSAGE_5:
74 73 65 52 20 64 6F 6F 47 2F 21 00'  0352    160          .ASCIC  "!/Good Restart Parameter Block Subtest - This subtest will!/"-
65 74 65 6D 61 72 61 50 20 74 72 61   035E
74 62 75 53 20 6B 63 6F 6C 42 20 72   036A
73 20 73 69 68 54 20 2D 20 74 73 65   0376
21 6C 6C 69 77 20 74 73 65 74 62 75   0382
                                 2F   038E
65 73 74 69 20 74 72 61 74 73 65 72   038F    161                  "restart itself if the RPB is properly interpreted.!/"-
50 52 20 65 68 74 20 66 69 20 66 6C   039B
6C 72 65 70 6F 72 70 20 73 69 20 42   03A7
65 74 65 72 70 72 65 74 6E 69 20 79   03B3
                        2F 21 2E 64   03BF
72 62 20 65 68 74 20 77 6F 72 68 54   03C3    162                  "Throw the breaker switch to power fail..."
68 63 74 69 77 73 20 72 65 6B 61 65   03CF
61 66 20 72 65 77 6F 70 20 6F 74 20   03DB
```

```
                    2E 2E 2E 6C 69  03E7
                                99  0352
                                    03EC   163 ;-----------------------------------------------------------------------
                                    03EC   164 T_MESSAGE_6:
6B 63 65 68 43 20 64 61 42 2F 21 00' 03EC   165         .ASCIC  "!/Bad Checksum Subtest - This subtest will halt the processor!/"-
20 74 73 65 74 62 75 53 20 6D 75 73  03F8
65 74 62 75 73 20 73 69 68 54 20 2D  0404
74 6C 61 68 20 6C 6C 69 77 20 74 73  0410
73 73 65 63 6F 72 70 20 65 68 74 20  041C
                        2F 21 72 6F  0428
20 74 6C 61 68 20 61 20 68 74 69 77  042C   166                 "with a halt code of 11. After this has happened the subtest!/"-
20 2E 31 31 20 66 6F 20 65 64 6F 63  0438
68 20 73 69 68 74 20 72 65 74 66 41  0444
20 64 65 6E 65 70 70 61 68 20 73 61  0450
21 74 73 65 74 62 75 73 20 65 68 74  045C
                                2F  0468
64 65 74 72 61 74 73 65 72 20 73 69  0469   167                 "is restarted by typing S 100 <CR> on the console terminal.!/"-
53 20 67 6E 69 70 79 74 20 79 62 20  0475
6E 6F 20 3E 52 43 3C 20 30 30 31 20  0481
65 6C 6F 73 6E 6F 63 20 65 68 74 20  048D
2F 21 2E 6C 61 6E 69 6D 72 65 74 20  0499
72 62 20 65 68 74 20 77 6F 72 68 54  04A5   168                 "Throw the breaker switch to power fail...!/"
68 63 74 69 77 73 20 72 65 6B 61 65  04B1
61 66 20 72 65 77 6F 70 20 6F 74 20  04BD
               2F 21 2E 2E 2E 6C 69  04C9
                                E3  03EC
                                    04D0   169 ;-----------------------------------------------------------------------
                                    04D0   170 T_MESSAGE_7:
6F 66 20 68 63 72 61 65 53 2F 21 00' 04D0   171         .ASCIC  "!/Search for Good RPB - This subtest will restart itself!/"-
2D 20 42 50 52 20 64 6F 6F 47 20 72  04DC
73 65 74 62 75 73 20 73 69 68 54 20  04E8
61 74 73 65 72 20 6C 6C 69 77 20 74  04F4
   2F 21 66 6C 65 73 74 69 20 74 72  0500
20 64 6F 6F 67 20 65 68 74 20 66 69  050B   172                 "if the good RPB is found and interpreted properly.!/"-
64 6E 75 6F 66 20 73 69 20 42 50 52  0517
72 70 72 65 74 6E 69 20 64 6E 61 20  0523
6C 72 65 70 6F 72 70 20 64 65 74 65  052F
                        2F 21 2E 79  053B
72 62 20 65 68 74 20 77 6F 72 68 54  053F   173                 "Throw the breaker switch to power fail..."
68 63 74 69 77 73 20 72 65 6B 61 65  054B
61 66 20 72 65 77 6F 70 20 6F 74 20  0557
                    2E 2E 2E 6C 69  0563
                                97  04D0
                                    0568   174 ;-----------------------------------------------------------------------
                                    0568   175 T_MESSAGE_8:
74 53 20 6D 72 61 57 2F 21 2F 21 00' 0568   176         .ASCIC  "!/!/Warm Start Flag Subtest - This subtest will halt the processo -
cont> r!/"-
62 75 53 20 67 61 6C 46 20 74 72 61  0574
20 73 69 68 54 20 2D 20 74 73 65 74  0580
6C 6C 69 77 20 74 73 65 74 62 75 73  058C
72 70 20 65 68 74 20 74 6C 61 68 20  0598
         2F 21 72 6F 73 73 65 63 6F  05A4
20 74 6C 61 68 20 61 20 68 74 69 77  05AD   177                 "with a halt code of 12. After this has happened the subtest!/"-
20 2E 32 31 20 66 6F 20 65 64 6F 63  05B9
68 20 73 69 68 74 20 72 65 74 66 41  05C5
20 64 65 6E 65 70 70 61 68 20 73 61  05D1
```

```
21 74 73 65 74 62 75 73 20 65 68 74   05DD
                                  2F   05E9
64 65 74 72 61 74 73 65 72 20 73 69   05EA   178                 "is restarted by typing S 100 <CR> on the console terminal.!/"-
53 20 67 6E 69 70 79 74 20 79 62 20   05F6
6E 6F 20 3E 52 43 3C 20 30 30 31 20   0602
65 6C 6F 73 6E 6F 63 20 65 68 74 20   060E
2F 21 2E 6C 61 6E 69 6D 72 65 74 20   061A
72 62 20 65 68 74 20 77 6F 72 68 54   0626   179                 "Throw the breaker switch to power fail...!/"
68 63 74 69 77 73 20 72 65 6B 61 65   0632
61 66 20 72 65 77 6F 70 20 6F 74 20   063E
                  2F 21 2E 2E 2E 6C   064A
                                  E8   0568
                                       0651   180 ;-----------------------------------------------------------------------
                                       0651   181 T_SWITCH:
74 73 65 72 20 65 72 6F 66 65 42 00'   0651   182         .ASCIC  "Before restarting set front panel switch to the HALT position.!/"
66 20 74 65 73 20 67 6E 69 74 72 61   065D
73 20 6C 65 6E 61 70 20 74 6E 6F 72   0669
65 68 74 20 6F 74 20 68 63 74 69 77   0675
69 74 69 73 6F 70 20 54 4C 41 48 20   0681
                     2F 21 2E 6E 6F   068D
                                  40   0651
                                       0692   183 ;-----------------------------------------------------------------------
                                       0692   184 T_BAT_BKUP:
73 20 73 69 68 74 20 73 49 0A 0D 00'   0692   185         .ASCIC  <13><10>"Is this system equiped with a battery backup?"<13><10>-
65 70 69 75 71 65 20 6D 65 74 73 79   069E
74 61 62 20 61 20 68 74 69 77 20 64   06AA
3F 70 75 6B 63 61 62 20 79 72 65 74   06B6
                                  0D   06C2
65 68 74 20 2C 6F 6E 20 66 49 28 0A   06C3   186                     "(If no, then set the front panel switch to the HALT position.)"<1 -
cont> 3><10>
72 66 20 65 68 74 20 74 65 73 20 6E   06CF
77 73 20 6C 65 6E 61 70 20 74 6E 6F   06DB
20 65 68 74 20 6F 74 20 68 63 74 69   06E7
6F 69 74 69 73 6F 70 20 54 4C 41 48   06F3
                     0A 0D 29 2E 6E   06FF
                                  71   0692
                                       0704   187 ;-----------------------------------------------------------------------
                                       0704   188
                                       0704   189 .SBTTL  ERROR MESSAGES
                                       0704   190 ;-----------------------------------------------------------------------
                                       0704   191 T_PWRUP_FAILURE:
74 6E 69 6F 70 20 6B 63 61 74 53 00'   0704   192         .ASCIC  "Stack pointer not equal to expected SP after power up"
6C 61 75 71 65 20 74 6F 6E 20 72 65   0710
64 65 74 63 65 70 78 65 20 6F 74 20   071C
6F 70 20 72 65 74 66 61 20 50 53 20   0728
                  70 75 20 72 65 77   0734
                                  35   0704
                                       073A   193
                                       073A   194 ;-----------------------------------------------------------------------
                                       073A   195 ; 5.2
                                       073A   196 T_NO_OPER:
6C 61 75 6E 61 4D 20 2F 21 2F 21 00'   073A   197         .ASCIC  "!/!/ Manual Section:  Tests 2 through 5 require operator interven -
cont> tion.!/"-
54 20 20 3A 6E 6F 69 74 63 65 53 20   0746
75 6F 72 68 74 20 32 20 73 74 73 65   0752
65 72 69 75 71 65 72 20 35 20 68 67   075E
6E 69 20 72 6F 74 61 72 65 70 6F 20   076A
```

```
21 2E 6E 6F 69 74 6E 65 76 72 65 74   0776
                              2F      0782
72 65 70 6F 20 65 68 74 20 74 65 53   0783    198                 "Set the operator flag to execute tests 2 through 5. !/"-
6F 74 20 67 61 6C 66 20 72 6F 74 61   078F
73 65 74 20 65 74 75 63 65 78 65 20   079B
68 67 75 6F 72 68 74 20 32 20 73 74   07A7
                  2F 21 20 2E 35 20   07B3
20 74 72 61 74 73 65 72 20 64 6E 61   07B9    199                 "and restart the sections. "
73 6E 6F 69 74 63 65 73 20 65 68 74   07C5
                        20 2E         07D1
                           98         073A
                                      07D3    200
                                      07D3    201 ;-----------------------------------------------------------------------
                                      07D3    202 T_PWRDN_ERROR:
20 6E 77 6F 64 20 72 65 77 6F 50 00'  07D3    203         .ASCIC  "Power down sequence did not complete"
64 69 64 20 65 63 6E 65 71 65 73      07DF
74 65 6C 70 6D 6F 63 20 74 6F 6E 20   07EB
                              65      07F7
                              24      07D3
                                      07F8    204
                                      07F8    205 ;-----------------------------------------------------------------------
                                      07F8    206 T_PWRUP_ERROR:
65 73 20 70 75 20 72 65 77 6F 50 00'  07F8    207         .ASCIC  "Power up sequence did not complete"
6E 20 64 69 64 20 65 63 6E 65 75 71   0804
   65 74 65 6C 70 6D 6F 63 20 74 6F   0810
                              22      07F8
                                      081B    208
                                      081B    209 ;-----------------------------------------------------------------------
                                      081B    210 T_BADMODE:
20 65 64 6F 6D 20 67 6E 6F 72 57 00'  081B    211         .ASCIC  "Wrong mode in PSL for power down and up"
70 20 72 6F 66 20 4C 53 50 20 6E 69   0827
6E 61 20 6E 77 6F 64 20 72 65 77 6F   0833
                        70 75 20 64   083F
                              27      081B
                                      0843    212
                                      0843    213 ;-----------------------------------------------------------------------
                                      0843    214 T_BADMODE_DN:
20 65 64 6F 6D 20 67 6E 6F 72 57 00'  0843    215         .ASCIC  "Wrong mode in PSL for power down sequence"
70 20 72 6F 66 20 4C 53 50 20 6E 69   084F
65 73 20 6E 77 6F 64 20 72 65 77 6F   085B
                  65 63 6E 65 75 71   0867
                              29      0843
                                      086D    216
                                      086D    217 ;-----------------------------------------------------------------------
                                      086D    218 T_BADMODE_UP:
20 65 64 6F 6D 20 67 6E 6F 72 57 00'  086D    219         .ASCIC  "Wrong mode in PSL for power up sequence"
70 20 72 6F 66 20 4C 53 50 20 6E 69   0879
75 71 65 73 20 70 75 20 72 65 77 6F   0885
                        65 63 6E 65   0891
                              27      086D
                                      0895    220
                                      0895    221 ;-----------------------------------------------------------------------
                                      0895    222 T_BADSTACK:
73 20 74 70 75 72 72 65 74 6E 49 00'  0895    223         .ASCIC  "Interrupt stack not used for power down and up"
65 73 75 20 74 6F 6E 20 6B 63 61 74   08A1
```

```
20 72 65 77 6F 70 20 72 6F 66 20 64   08AD
   70 75 20 64 6E 61 20 6E 77 6F 64   08B9
                                 2E   0895
                                      08C4    224
                                      08C4    225 ;-----------------------------------------------------------------------
                                      08C4    226 T_BADSTACK_DN:
73 20 74 70 75 72 72 65 74 6E 49 00'  08C4    227         .ASCIC  "Interrupt stack not used for power down sequence"
65 73 75 20 74 6F 6E 20 6B 63 61 74   08D0
20 72 65 77 6F 70 20 72 6F 66 20 64   08DC
63 6E 65 75 71 65 73 20 6E 77 6F 64   08E8
                                 65   08F4
                                 30   08C4
                                      08F5    228
                                      08F5    229 ;-----------------------------------------------------------------------
                                      08F5    230 T_BADSTACK_UP:
73 20 74 70 75 72 72 65 74 6E 49 00'  08F5    231         .ASCIC  "Interrupt stack not used for power up sequence"
65 73 75 20 74 6F 6E 20 6B 63 61 74   0901
20 72 65 77 6F 70 20 72 6F 66 20 64   090D
   65 63 6E 65 75 71 65 73 20 70 75   0919
                                 2E   08F5
                                      0924    232
                                      0924    233 ;-----------------------------------------------------------------------
```

```
                        0924   235 .SBTTL  SUBROUTINES
                        0924   236
                        0924   237 ; This is the Power Fail interrupt service routine which is entered
                        0924   238 ; upon an interrupt due to loss of power. The internal processor
                        0924   239 ; registers, frame pointer, stack pointer, argument pointer and
                        0924   240 ; all general purpose registers are saved in memory befor all power
                        0924   241 ; is lost. If this is completed sucessfully a flag is set and then
                        0924   242 ; this routine goes into a loop, waiting for power to be totaly lost.
                        0924   243
                        0924   244         .ALIGN  LONG
                        0924   245 POWER_DOWN:
     58  00000000'FF    DE   0924   246         MOVAL   @A_PWR_BUFFER,R8        ; load R8 with address of buffer
         F6DD CF        DC   092B   247         MOVPSL  L_PSL                   ; save contents of the current PSL
         02   18        EC   092F   248         CMPV    #PSL$V_CURMOD,#PSL$S_CURMOD,-
      00 F6D7 CF             0932   249                 L_PSL,#PSL$K_KERNEL     ; check PSL for current mode = kernel
                05   13   0936   250         BEQL    1$                      ; br = kernel mode
         F6DD CF    01   88   0938   251         BISB2   #M_BADMODE_DN,B_FLAGS2  ; flag bad mode on power down
      15 F6CA CF    1A   E0   093D   252 1$:     BBS     #PSL$V_IS,L_PSL,2$      ; br = on interrupt stack
         F6D2 CF    04   88   0943   253         BISB2   #M_BADSTACK_DN,B_FLAGS2 ; flag bad stack on power down
F6BF CF  00000000'8F    DB   0948   254         MFPR    #PR$_ISP,L_IS_SP        ; save interrupt stack pointer
         F6BE CF    5E   D0   0951   255         MOVL    SP,L_KS_SP              ; save kernel stack pointer
                    0E   11   0956   256         BRB     3$                      ; go save other processor registers
         F6B3 CF    5E   D0   0958   257 2$:     MOVL    SP,L_IS_SP              ; save interrupt stack pointer
F6AE CF  00000000'8F    DB   095D   258         MFPR    #PR$_KSP,L_KS_SP        ; save kernel stack pointer
                88   5C   D0   0966   259 3$:     MOVL    AP,(R8)+                ; save processor registers
                88   5D   D0   0969   260         MOVL    FP,(R8)+
     88  00000000'8F    DB   096C   261         MFPR    #PR$_ESP,(R8)+
     88  00000000'8F    DB   0973   262         MFPR    #PR$_SSP,(R8)+
     88  00000000'8F    DB   097A   263         MFPR    #PR$_USP,(R8)+
     88  00000000'8F    DB   0981   264         MFPR    #PR$_SBR,(R8)+
     88  00000000'8F    DB   0988   265         MFPR    #PR$_SLR,(R8)+
     88  00000000'8F    DB   098F   266         MFPR    #PR$_PCBB,(R8)+
     88  00000000'8F    DB   0996   267         MFPR    #PR$_P0BR,(R8)+
     88  00000000'8F    DB   099D   268         MFPR    #PR$_P0LR,(R8)+
     88  00000000'8F    DB   09A4   269         MFPR    #PR$_P1BR,(R8)+
     88  00000000'8F    DB   09AB   270         MFPR    #PR$_P1LR,(R8)+
     88  00000000'8F    DB   09B2   271         MFPR    #PR$_ASTLVL,(R8)+
     88  00000000'8F    DB   09B9   272         MFPR    #PR$_SCBB,(R8)+
     F63B CF    58   D0   09C0   273         MOVL    R8,L_BUF_BEGIN          ; save address of data in memory
     F64F CF    01   88   09C5   274         BISB2   #M_PWRDN_DONE,B_FLAGS   ; set done flag
                FE   11   09CA   275 4$:     BRB     4$                      ; wait
                        09CC   276
                        09CC   277
                        09CC   278
                        09CC   279 ; This is the Power Up routine which is pointed to by either the Restart
                        09CC   280 ; Parameter Block (RPB) or is entered through the restart code when a
                        09CC   281 ; nonrecoverable power fail has occured. This routine will restore all
                        09CC   282 ; of the information which was saved in the power down routine and also
                        09CC   283 ; sets a done flag to indicate that the power up sequence was sucessful.
                        09CC   284
                        09CC   285 POWER_UP:
     58   F630 CF    D0   09CC   286         MOVL    L_BUF_BEGIN,R8          ; load address of data
00000000'8F   78    DA   09D1   287         MTPR    -(R8),#PR$_SCBB         ; load SCBB to handle any exceptions
         F630 CF    DC   09D8   288         MOVPSL  L_PSL                   ; save current PSL
         02   18    EC   09DC   289         CMPV    #PSL$V_CURMOD,#PSL$S_CURMOD,-
```

```
          00   F62A CF        09DF   290                 L_PSL,#PSL$K_KERNEL      ; check current mode = kernel
                    05   13   09E3   291         BEQL    1$                       ; br = current mode kernel
          F630 CF   02   88   09E5   292         BISB2   #M_BADMODE_UP,B_FLAGS2   ; flag bad mode on power up
       15 F61D CF   1A   E0   09EA   293 1$:     BBS     #PSL$V_IS,L_PSL,2$       ; br = on interrupt stack
          F625 CF   08   88   09F0   294         BISB2   #M_BADSTACK_UP,B_FLAGS2  ; flag bad stack on power up
 00000000'8F   F617 CF   DA   09F5   295         MTPR    L_IS_SP,#PR$_ISP         ; load interrupt SP
          5E   F612 CF   D0   09FE   296         MOVL    L_KS_SP,SP               ; load kernel SP
                    0E   11   0A03   297         BRB     3$                       ; restore other processor registers
          5E   F607 CF   D0   0A05   298 2$:     MOVL    L_IS_SP,SP               ; load interrupt SP
 00000000'8F   F606 CF   DA   0A0A   299         MTPR    L_KS_SP,#PR$_KSP         ; load kernel SP
     00000000'8F   78   DA   0A13   300 3$:     MTPR    -(R8),#PR$_ASTLVL        ; restore other processor registers
     00000000'8F   78   DA   0A1A   301         MTPR    -(R8),#PR$_P1LR
     00000000'8F   78   DA   0A21   302         MTPR    -(R8),#PR$_P1BR
     00000000'8F   78   DA   0A28   303         MTPR    -(R8),#PR$_P0LR
     00000000'8F   78   DA   0A2F   304         MTPR    -(R8),#PR$_P0BR
     00000000'8F   78   DA   0A36   305         MTPR    -(R8),#PR$_PCBB
     00000000'8F   78   DA   0A3D   306         MTPR    -(R8),#PR$_SLR
     00000000'8F   78   DA   0A44   307         MTPR    -(R8),#PR$_SBR
     00000000'8F   78   DA   0A4B   308         MTPR    -(R8),#PR$_USP
     00000000'8F   78   DA   0A52   309         MTPR    -(R8),#PR$_SSP
     00000000'8F   78   DA   0A59   310         MTPR    -(R8),#PR$_ESP
              5D   78   D0   0A60   311         MOVL    -(R8),FP
              5C   78   D0   0A63   312         MOVL    -(R8),AP
       1E F5AF CF   00   E0   0A66   313         BBS     #V_BADMODE_DN,B_FLAGS2,5$ ; br = bad mode on power down
       4E F5A9 CF   01   E1   0A6C   314         BBC     #V_BADMODE_UP,B_FLAGS2,9$ ; br = both modes good
                             0A72   315         $DS_ERRHARD_S   UNIT=#0, MSGADR=T_BADMODE_UP
                    00   DD   0A72                         PUSHL   #0
              FDF5 CF   DF   0A74                         PUSHAL  T_BADMODE_UP
                    00   DD   0A78                         PUSHL   #0
                    01   DD   0A7A                         PUSHL   #$ER
                             0A7C       ;;; TEST 2, SUBTEST 0, ERROR 1
     000100D0 9F   04   FB   0A7C                         CALLS   #$$M, @#DS$ERRHARD
                             0A83   316         $DS_ABORT
     00010020 9F   6C   FA   0A83                         CALLG   (AP), @#DS$ABORT
       18 F58B CF   01   E1   0A8A   317 5$:     BBC     #V_BADMODE_UP,B_FLAGS2,7$ ; br = bad mode on power down only
                             0A90   318         $DS_ERRHARD_S   UNIT=#0, MSGADR=T_BADMODE
                    00   DD   0A90                         PUSHL   #0
              FD85 CF   DF   0A92                         PUSHAL  T_BADMODE
                    00   DD   0A96                         PUSHL   #0
                    02   DD   0A98                         PUSHL   #$ER
                             0A9A       ;;; TEST 2, SUBTEST 0, ERROR 2
     000100D0 9F   04   FB   0A9A                         CALLS   #$$M, @#DS$ERRHARD
                             0AA1   319         $DS_ABORT
     00010020 9F   6C   FA   0AA1                         CALLG   (AP), @#DS$ABORT
                             0AA8   320 7$:     $DS_ERRHARD_S   UNIT=#0, MSGADR=T_BADMODE_DN
                    00   DD   0AA8                         PUSHL   #0
              FD95 CF   DF   0AAA                         PUSHAL  T_BADMODE_DN
                    00   DD   0AAE                         PUSHL   #0
                    03   DD   0AB0                         PUSHL   #$ER
                             0AB2       ;;; TEST 2, SUBTEST 0, ERROR 3
     000100D0 9F   04   FB   0AB2                         CALLS   #$$M, @#DS$ERRHARD
                             0AB9   321         $DS_ABORT
     00010020 9F   6C   FA   0AB9                         CALLG   (AP), @#DS$ABORT
       1E F555 CF   02   E0   0AC0   322 9$:     BBS     #V_BADSTACK_DN,B_FLAGS2,11$ ; br = bad stack on power down
       4E F54F CF   03   E1   0AC6   323         BBC     #V_BADSTACK_UP,B_FLAGS2,15$ ; br = both stacks good
```

```
                                0ACC   324          $DS_ERRHARD_S   UNIT=#0, MSGADR=T_BADSTACK_UP
                     00    DD   0ACC                        PUSHL   #0
                FE23 CF    DF   0ACE                        PUSHAL  T_BADSTACK_UP
                     00    DD   0AD2                        PUSHL   #0
                     04    DD   0AD4                        PUSHL   #$ER
                                0AD6        ;;; TEST 2, SUBTEST 0, ERROR 4
        000100D0 9F  04    FB   0AD6                        CALLS   #$$M, a#DS$ERRHARD
                                0ADD   325          $DS_ABORT
        00010020 9F  6C    FA   0ADD                        CALLG   (AP), a#DS$ABORT
         18 F531 CF  03    E1   0AE4   326 11$:     BBC     #V_BADSTACK_UP,B_FLAGS2,13$ ; br = bad stack power down only
                                0AEA   327          $DS_ERRHARD_S   UNIT=#0, MSGADR=T_BADSTACK
                     00    DD   0AEA                        PUSHL   #0
                FDA5 CF    DF   0AEC                        PUSHAL  T_BADSTACK
                     00    DD   0AF0                        PUSHL   #0
                     05    DD   0AF2                        PUSHL   #$ER
                                0AF4        ;;; TEST 2, SUBTEST 0, ERROR 5
        000100D0 9F  04    FB   0AF4                        CALLS   #$$M, a#DS$ERRHARD
                                0AFB   328          $DS_ABORT
        00010020 9F  6C    FA   0AFB                        CALLG   (AP), a#DS$ABORT
                                0B02   329 13$:     $DS_ERRHARD_S   UNIT=#0, MSGADR=T_BADSTACK_DN
                     00    DD   0B02                        PUSHL   #0
                FDBC CF    DF   0B04                        PUSHAL  T_BADSTACK_DN
                     00    DD   0B08                        PUSHL   #0
                     06    DD   0B0A                        PUSHL   #$ER
                                0B0C        ;;; TEST 2, SUBTEST 0, ERROR 6
        000100D0 9F  04    FB   0B0C                        CALLS   #$$M, a#DS$ERRHARD
                                0B13   330          $DS_ABORT
        00010020 9F  6C    FA   0B13                        CALLG   (AP), a#DS$ABORT
            F4FA CF  02    88   0B1A   331 15$:     BISB2   #M_PWRUP_DONE,B_FLAGS    ; set done flag
                           02   0B1F   332          REI                              ; return to test
                                0B20   333
                                0B20   334
                                0B20   335 ; This routine will calculate the checksum for the power up routine to
                                0B20   336 ; be stored in the restart paramerter block.
                                0B20   337
                                0B20   338 CALC_CHECKSUM:
                     54    D4   0B20   339          CLRL    R4                       ; init R4 to store checksum
            F4DD CF  01    D0   0B22   340          MOVL    #1,L_COUNT               ; initialize counter
            53   FEA1 CF   DE   0B27   341          MOVAL   POWER_UP,R3              ; get address of power up routine
                 54    83   C0   0B2C   342 1$:     ADDL2   (R3)+,R4                 ; add long word checksum
         F7 F4D0 CF  1F    F3   0B2F   343          AOBLEQ  #^X1F,L_COUNT,1$         ; br = not finished
            F4CE CF  54    D0   0B35   344          MOVL    R4,L_CHECKSUM            ; save checksum
                           05   0B3A   345          RSB                              ; return
                                0B3B   346
                                0B3B   347 ; This routine will clear the first page of buffer area.
                                0B3B   348
                                0B3B   349 CLEAR_BUFFER:
        55   00000000'FF   DE   0B3B   350          MOVAL   @A_BUFFER_BEGIN,R5       ; get starting buffer address
                F4BE CF    D4   0B42   351          CLRL    L_COUNT                  ; init counter
                     85    D4   0B46   352 1$:     CLRL    (R5)+                    ; clear buffer location
F4 F4B3 CF   00000080 8F   F3   0B48   353          AOBLEQ  #128,L_COUNT,1$          ; br = not finished
                           05   0B52   354          RSB                              ; return
                                0B53   355
                                0B53   356
                                0B53   357          $DS_PAGE
```

```
                        0B53                    .SBTTL  TEST 2:   POWER FAIL (INIT SWITCH)
                     00000000                           .PSECT  TEST_002, PAGE, NOWRT
                        0020
                        0020    360 ;++
                        0020    361 ; Test description:
                        0020    362 ;
                        0020    363 ;       This test consists of a series of manual operator intervention
                        0020    364 ;       subtests. These subtests will check that the Restart Parameter Block
                        0020    365 ;       (RPB) is recognizable and causes the proper sequence of events in
                        0020    366 ;       the occurrence of a power failure. Initially the power fail is
                        0020    367 ;       induced by pushing the initialize switch on the front panel of the
                        0020    368 ;       11/750. This simulates a power fail without removing all power from
                        0020    369 ;       the system. When this test is complete the operator will be prompted
                        0020    370 ;       to repeat the test using the breaker switch on the back of the system
                        0020    371 ;       if it is equipped with a battery backup. If a negative responce is
                        0020    372 ;       received the test is exited and the power fail test is complete.
                        0020    373 ;
                        0020    374 ;
                        0020    375 ; Assumptions:
                        0020    376 ;
                        0020    377 ;       For this test to function properly the right front panel select
                        0020    378 ;       switch must be in the HALT/RESTART position and the key switch
                        0020    379 ;       must be in the LOCAL position.
                        0020    380 ;
                        0020    381 ;--
                        0020    382
                        0020    383         $DS_BGNTEST     <MANUAL,POWER_FAIL,ALL>
                        0020        DATA_002:
                     00000000   0020                 .LONG   0                       ; TEST ARGUMENT TABLE TERMINATOR
                        0024        TEST_002::
                        0000    0024                 .WORD   ^M<>                    ; ENTRY MASK
                        0026    384         $DS_BOPER  1$                           ; Is operator present?
                     0C   E0    0026                 BBS     #DSA$V_OPER,-      ; BR IF OPERATOR
                14 0000FE00 9F  0028                 @#DSA$GL_FLAGS, 1$
                        002E    385         $DS_PRINTF_S    FORMAT=T_NO_OPER        ; Indicate no operator. 5.2
                 0000073A'EF    9F  002E                 PUSHAB  T_NO_OPER
            000100F0 9F 01      FB  0034                 CALLS   #$$N, @#DS$PRINTF
                        003B    386         $DS_ABORT                               ; No, Abort
            00010020 9F 6C      FA  003B                 CALLG   (AP), @#DS$ABORT
                        0042    387 1$:     $DS_SETVEC_S    VECTOR=#SCB$L_POWER, SRVADR=POWER_DOWN, CODE=#1
                     01 DD      0042                 PUSHL   #1
                 00000924'EF    DF  0044                 PUSHAL  POWER_DOWN
                     0C DD      004A                 PUSHL   #SCB$L_POWER
            00010160 9F 03      FB  004C                 CALLS   #3, @#DS$SETVEC
                        0053    388
                 00000B20'EF    16  0053    389 2$:     JSB     CALC_CHECKSUM   ; calculate good checksum for RPB.
                        0059    390         $DS_PRINTF_S    FORMAT=T_INST
                 00000021'EF    9F  0059                 PUSHAB  T_INST
            000100F0 9F 01      FB  005F                 CALLS   #$$N, @#DS$PRINTF
                        0066    391         $DS_PAGE
```

```
                                0066                .SBTTL  SUBTEST 2.1:  GOOD RPB SUBTEST
                                0066    394 ;+
                                0066    395 ; SUBTEST DESCRIPTION:
                                0066    396 ;
                                0066    397 ;       This subtest sets up a good RPB at location zero, which points to
                                0066    398 ;       a power up routine that restores all pertinent processor registers,
                                0066    399 ;       the argument pointer, frame pointer and stack pointer. The operator
                                0066    400 ;       is instructed through the console terminal to push the initialize
                                0066    401 ;       switch on the front panel to simulate a CPU power failure. If the
                                0066    402 ;       RPB is intrepreted properly the instrucions for the next subtest will
                                0066    403 ;       be printed on the console terminal. If an error occured, either the
                                0066    404 ;       processor will halt unexpectedly or an error report will be generated
                                0066    405 ;       by the diagnostic supervisor.
                                0066    406 ;
                                0066    407 ;
                                0066    408 ; SUBTEST STEPS:
                                0066    409 ;
                                0066    410 ;       SUBTEST GOOD RPB
                                0066    411 ;       :  Setup good RPB at location 0
                                0066    412 ;       :  Send instructions to operator
                                0066    413 ;       :  Recover from power fail
                                0066    414 ;       ENDSUBTEST GOOD RPB
                                0066    415 ;
                                0066    416 ;
                                0066    417 ; ERRORS:
                                0066    418 ;
                                0066    419 ;
                                0066    420 ; DEBUG:
                                0066    421 ;
                                0066    422 ;
                                0066    423 ;-
                                0066    424             $DS_BGNSUB
                                0066                T2_S1::
00010030 9F   00000000'EF   FA  0066                        CALLG   $S$, a#DS$BGNSUB
                                0071    425
         00000B3B'EF   16       0071    426             JSB     CLEAR_BUFFER    ; clear buffer area
         00000019'EF   94       0077    427             CLRB    B_FLAGS         ; initialize flags
         0000001A'EF   94       007D    428             CLRB    B_FLAGS2        ; init flags2
             55   00   D0       0083    429             MOVL    #0,R5           ; load address to build RPB
             85   00   D0       0086    430             MOVL    #0,(R5)+        ; load first longword with the address
      85 000009CC'EF   DE       0089    431             MOVAL   POWER_UP,(R5)+  ; load address of restart routine
      85 00000008'EF   D0       0090    432             MOVL    L_CHECKSUM,(R5)+ ; load good restart routine checksum
                  65   D4       0097    433             CLRL    (R5)            ; clear warm start flag
                                0099    434             $DS_PRINTF_S    FORMAT=T_MESSAGE_1
         00000063'EF   9F       0099                    PUSHAB  T_MESSAGE_1
   000100F0 9F   01   FB       009F                    CALLS   #$$N, a#DS$PRINTF
                                00A6    435
                                00A6    436 POWER_DOWN_1:
                                00A6    437             $DS_BREAK
   00010058 9F   6E   FA       00A6                    CALLG   (SP), a#DS$BREAK
02 00000019'EF   01   E0       00AD    438             BBS     #V_PWRUP_DONE,B_FLAGS,1$ ; br = power up done
                  EF   11       00B5    439             BRB     POWER_DOWN_1    ; wait for power fail interrupt
                                00B7    440
1A 00000019'EF   00   E0       00B7    441 1$:         BBS     #V_PWRDN_DONE,B_FLAGS,3$ ; br = power down sequence complete
                                00BF    442             $DS_ERRHARD_S   UNIT=#0, MSGADR=T_PWRDN_ERROR
```

```
                        00   DD  00BF                          PUSHL   #0
                000007D3'EF   DF  00C1                          PUSHAL  T_PWRDN_ERROR
                        00   DD  00C7                          PUSHL   #0
                        01   DD  00C9                          PUSHL   #$ER
                                 00CB        ;;; TEST 2, SUBTEST 1, ERROR 1
          000100D0 9F   04   FB  00CB                          CALLS   #$$M, @#DS$ERRHARD
                                 00D2   443          $DS_ABORT
          00010020 9F   6C   FA  00D2                          CALLG   (AP), @#DS$ABORT
                                 00D9   444 3$:
                                 00D9   445          $DS_ENDSUB
                                 00D9        T2_S1_X:
   00010038 9F   00000000'EF   FA  00D9                          CALLG   $S$, @#DS$ENDSUB
                                 00E4   446
                                 00E4   447          $DS_PAGE
```

```
                        00E4                    .SBTTL  SUBTEST 2.2:  BAD CHECKSUM SUBTEST
                        00E4    450 ;+
                        00E4    451 ; SUBTEST DESCRIPTION:
                        00E4    452 ;
                        00E4    453 ;       This subtest sets up an RPB at location zero with a bad checksum.
                        00E4    454 ;       It points to a power up routine that restores all pertinent processor
                        00E4    455 ;       registers, the argument pointer, frame pointer and stack pointer.
                        00E4    456 ;       The operator is instructed through the console terminal to push the
                        00E4    457 ;       initialize switch on the front panel to simulate a CPU power failure,
                        00E4    458 ;       check the halt code, and start a the indicated location. If the RPB is
                        00E4    459 ;       intrepreted properly a halt code of 11 will be printed on the console
                        00E4    460 ;       terminal. At this point the machine will be in console mode and the
                        00E4    461 ;       operator should type "S 100" followed by a carrage return to continue
                        00E4    462 ;       testing. If the expected halt code is not printed on the console
                        00E4    463 ;       terminal then an error has occured.
                        00E4    464 ;
                        00E4    465 ;
                        00E4    466 ; SUBTEST STEPS:
                        00E4    467 ;
                        00E4    468 ;       SUBTEST BAD CHECKSUM
                        00E4    469 ;       :  Setup RPB at location 0 with bad checksum
                        00E4    470 ;       :  Send instructions to operator
                        00E4    471 ;       :  Recover from fatal power fail
                        00E4    472 ;       ENDSUBTEST BAD CHECKSUM
                        00E4    473 ;
                        00E4    474 ;
                        00E4    475 ; ERRORS:
                        00E4    476 ;
                        00E4    477 ;
                        00E4    478 ; DEBUG:
                        00E4    479 ;
                        00E4    480 ;
                        00E4    481 ;-
                        00E4    482             $DS_BGNSUB
                        00E4        T2_S2::
                                                CALLG   $S$, a#DS$BGNSUB
00010030 9F     0000000C'EF     FA  00E4
                00000B3B'EF     16  00EF    483         JSB     CLEAR_BUFFER    ; clear buffer area
                00000019'EF     94  00F5    484         CLRB    B_FLAGS         ; initialize flags
                0000001A'EF     94  00FB    485         CLRB    B_FLAGS2        ; init flags2
                    55  00      D0  0101    486         MOVL    #0,R5           ; load address to build RPB
                    85  00      D0  0104    487         MOVL    #0,(R5)+        ; load first longword with the address
            85  000009CC'EF     DE  0107    488         MOVAL   POWER_UP,(R5)+  ; load address of restart routine
            65  00000008'EF     D0  010E    489         MOVL    L_CHECKSUM,(R5) ; load good restart routine checksum
                    85  01      C2  0115    490         SUBL2   #1,(R5)+        ; make the checksum bad
                        65      D4  0118    491         CLRL    (R5)            ; clear warm start flag
00000100'EF     0000001B'EF     7D  011A    492         MOVQ    JUMP,STRTUP     ; load addr 100 with JMP a#POWER_UP to restart
                                    0125    493         $DS_PRINTF_S    FORMAT=T_MESSAGE_2
                000000F9'EF     9F  0125                PUSHAB  T_MESSAGE_2
            000100F0 9F         01  FB  012B            CALLS   #$$N, a#DS$PRINTF
                                    0132    494
                                    0132    495 POWER_DOWN_2:
                                    0132    496         $DS_BREAK
            00010058 9F         6E  FA  0132            CALLG   (SP), a#DS$BREAK
        02 00000019'EF          01  E0  0139    497         BBS     #V_PWRUP_DONE,B_FLAGS,1$ ; br = power up sequence complete
                                EF  11  0141    498         BRB     POWER_DOWN_2    ; wait for power fail interrupt
```

```
                                  0143   499
        1A 00000019'EF   00   E0  0143   500 1$:     BBS     #V_PWRDN_DONE,B_FLAGS,3$ ; br = power down sequence complete
                                  014B   501         $DS_ERRHARD_S   UNIT=#0, MSGADR=T_PWRDN_ERROR
                         00   DD  014B                     PUSHL   #0
                000007D3'EF   DF  014D                     PUSHAL  T_PWRDN_ERROR
                         00   DD  0153                     PUSHL   #0
                         01   DD  0155                     PUSHL   #$ER
                                  0157       ;;; TEST 2, SUBTEST 2, ERROR 1
           000100D0 9F   04   FB  0157                     CALLS   #$$M, @#DS$ERRHARD
                                  015E   502         $DS_ABORT
           00010020 9F   6C   FA  015E                     CALLG   (AP), @#DS$ABORT
                                  0165   503 3$:
                                  0165   504         $DS_ENDSUB
                                  0165       T2_S2_X:
   00010038 9F   0000000C'EF   FA  0165                     CALLG   $S$, @#DS$ENDSUB
                                  0170   505
                                  0170   506         $DS_PAGE
```

```
                                0170                    .SBTTL  SUBTEST 2.3:  SEARCH FOR GOOD RPB
                                0170    509 ;+
                                0170    510 ; SUBTEST DESCRIPTION:
                                0170    511 ;
                                0170    512 ;       This subtest sets up an RPB at location zero with a bad checksum.
                                0170    513 ;       It also sets up a good RPB at a higher page boundary which points
                                0170    514 ;       to a power up routine that restores all pertinent processor
                                0170    515 ;       registers, the argument pointer, frame pointer and stack pointer.
                                0170    516 ;       The operator is instructed through the console terminal to push the
                                0170    517 ;       initialize switch on the front panel to simulate a CPU power failure.
                                0170    518 ;       If the RPB is intrepreted properly the next subtest instructions will
                                0170    519 ;       be printed on the console terminal. If an error occured, either the
                                0170    520 ;       processor will halt unexpectedly or an error report will be generated
                                0170    521 ;       by the diagnostic supervisor.
                                0170    522 ;
                                0170    523 ;
                                0170    524 ; SUBTEST STEPS:
                                0170    525 ;
                                0170    526 ;       SUBTEST SEARCH FOR GOOD RPB
                                0170    527 ;       :  Setup RPB at location 0 with bad checksum
                                0170    528 ;       :  Setup good RPB at higher page boundary
                                0170    529 ;       :  Send instructions to operator
                                0170    530 ;       ENDSUBTEST SEARCH FOR GOOD RPB
                                0170    531 ;
                                0170    532 ;
                                0170    533 ; ERRORS:
                                0170    534 ;
                                0170    535 ;
                                0170    536 ; DEBUG:
                                0170    537 ;
                                0170    538 ;
                                0170    539 ;-
                                0170    540             $DS_BGNSUB
                                0170            T2_S3::
00010030 9F    00000018'EF   FA 0170                    CALLG   $S$, a#DS$BGNSUB
         00000B3B'EF   16 017B    541            JSB     CLEAR_BUFFER        ; clear buffer area
         00000019'EF   94 0181    542            CLRB    B_FLAGS             ; initialize flags
         0000001A'EF   94 0187    543            CLRB    B_FLAGS2            ; init flags2
             55   00   D0 018D    544            MOVL    #0,R5               ; load address to build bad RPB
             85   00   D0 0190    545            MOVL    #0,(R5)+            ; load first longword with the address
      85 000009CC'EF   DE 0193    546            MOVAL   POWER_UP,(R5)+      ; load address of restart routine
      65 00000008'EF   D0 019A    547            MOVL    L_CHECKSUM,(R5)     ; load good restart routine checksum
             85   01   C0 01A1    548            ADDL2   #1,(R5)+            ; make checksum bad
                  65   D4 01A4    549            CLRL    (R5)                ; clear warm start flag
      55 00000000'FF   DE 01A6    550            MOVAL   a#A_BUFFER_BEGIN,R5 ; load address to build good RPB
      85 00000000'FF   DE 01AD    551            MOVAL   a#A_BUFFER_BEGIN,(R5)+ ; load first longword with the address
      85 000009CC'EF   DE 01B4    552            MOVAL   POWER_UP,(R5)+      ; load address of restart routine
      85 00000008'EF   D0 01BB    553            MOVL    L_CHECKSUM,(R5)+    ; load good restart routine checksum
                  65   D4 01C2    554            CLRL    (R5)                ; clear warm start flag
                                01C4    555            $DS_PRINTF_S    FORMAT=T_MESSAGE_3
         000001D9'EF   9F 01C4                    PUSHAB  T_MESSAGE_3
      000100F0 9F      01 FB 01CA                CALLS   #$$N, a#DS$PRINTF
                                01D1    556
                                01D1    557 POWER_DOWN_3:
                                01D1    558             $DS_BREAK
```

```
                00010058 9F    6E    FA  01D1                          CALLG   (SP), a#DS$BREAK
             02 00000019'EF    01    E0  01D8   559          BBS     #V_PWRUP_DONE,B_FLAGS,1$ ; br = power up sequence complete
                               EF    11  01E0   560          BRB     POWER_DOWN_3    ; wait for power fail interrupt
                                         01E2   561
             1A 00000019'EF    00    E0  01E2   562 1$:      BBS     #V_PWRDN_DONE,B_FLAGS,3$ ; br = power down sequence complete
                                         01EA   563          $DS_ERRHARD_S   UNIT=#0, MSGADR=T_PWRDN_ERROR
                               00    DD  01EA                          PUSHL   #0
                     000007D3'EF     DF  01EC                          PUSHAL  T_PWRDN_ERROR
                               00    DD  01F2                          PUSHL   #0
                               01    DD  01F4                          PUSHL   #$ER
                                         01F6       ;;; TEST 2, SUBTEST 3, ERROR 1
                000100D0 9F    04    FB  01F6                          CALLS   #$$M, a#DS$ERRHARD
                                         01FD   564          $DS_ABORT
                00010020 9F    6C    FA  01FD                          CALLG   (AP), a#DS$ABORT
                                         0204   565 3$:
                                         0204   566          $DS_ENDSUB
                                         0204       T2_S3_X:
    00010038 9F    00000018'EF    FA    0204                          CALLG   $S$, a#DS$ENDSUB
                                         020F   567
                                         020F   568          $DS_PAGE
```

```
                                020F                    .SBTTL  SUBTEST 2.4:  WARM START FLAG SUBTEST
                                020F    571 ;+
                                020F    572 ; SUBTEST DESCRIPTION:
                                020F    573 ;
                                020F    574 ;       This subtest sets up an RPB at location zero with the warm start flag
                                020F    575 ;       set. The RPB points to a power up routine that restores all pertinent
                                020F    576 ;       processor registers, the argument pointer, frame pointer and stack
                                020F    577 ;       pointer. The operator is instructed through the console terminal to
                                020F    578 ;       push the initialize switch on the front panel to simulate a CPU power
                                020F    579 ;       failure, check the halt code, and start at location 100. If the RPB is
                                020F    580 ;       intrepreted properly a halt code of 12 will be printed on the console
                                020F    581 ;       terminal. At this point the machine will be in console mode and the
                                020F    582 ;       operator should type "S 100" followed by a carrage return to continue
                                020F    583 ;       testing. If the expected halt code is not printed on the console
                                020F    584 ;       terminal then an error has occured and the warm start flag was not
                                020F    585 ;       recognized.
                                020F    586 ;
                                020F    587 ; SUBTEST STEPS:
                                020F    588 ;
                                020F    589 ;       SUBTEST WARM START FLAG
                                020F    590 ;       :  Setup RPB at location 0 with warm start flag set
                                020F    591 ;       :  Send instructions to operator
                                020F    592 ;       :  Recover from fatal power fail
                                020F    593 ;       ENDSUBTEST WARM START FLAG
                                020F    594 ;
                                020F    595 ; ERRORS:
                                020F    596 ;
                                020F    597 ;
                                020F    598 ; DEBUG:
                                020F    599 ;
                                020F    600 ;
                                020F    601 ;-
                                020F    602             $DS_BGNSUB
                                020F            T2_S4::
00010030 9F    00000024'EF   FA 020F                    CALLG   $S$, a#DS$BGNSUB
               00000B3B'EF   16 021A    603            JSB     CLEAR_BUFFER    ; clear buffer area
               00000019'EF   94 0220    604            CLRB    B_FLAGS         ; initialize flags
               0000001A'EF   94 0226    605            CLRB    B_FLAGS2        ; init flags2
                   55   00   D0 022C    606            MOVL    #0,R5           ; load address to build RPB
                   85   00   D0 022F    607            MOVL    #0,(R5)+        ; load first longword with the address
         85    000009CC'EF   DE 0232    608            MOVAL   POWER_UP,(R5)+  ; load address of restart routine
         85    00000008'EF   D0 0239    609            MOVL    L_CHECKSUM,(R5)+ ; load good restart routine checksum
                   65   01   D0 0240    610            MOVL    #1,(R5)         ; clear warm start flag
00000100'EF    0000001B'EF   7D 0243    611            MOVQ    JUMP,STRTUP     ; load location 100 with jump instruction
                                024E    612            $DS_PRINTF_S    FORMAT=T_MESSAGE_4
               0000026D'EF   9F 024E                    PUSHAB  T_MESSAGE_4
         000100F0 9F   01   FB 0254                    CALLS   #$$N, a#DS$PRINTF
                                025B    613 POWER_DOWN_4:
                                025B    614            $DS_BREAK
         00010058 9F   6E   FA 025B                    CALLG   (SP), a#DS$BREAK
      02 00000019'EF   01   E0 0262    615            BBS     #V_PWRUP_DONE,B_FLAGS,1$ ; br = power up sequence complete
                       EF   11 026A    616            BRB     POWER_DOWN_4    ; wait for power fail interrupt
                                026C    617
      1A 00000019'EF   00   E0 026C    618 1$:        BBS     #V_PWRDN_DONE,B_FLAGS,3$ ; br = power down sequence complete
                                0274    619            $DS_ERRHARD_S   UNIT=#0, MSGADR=T_PWRDN_ERROR
```

```
                        00   DD  0274                          PUSHL   #0
                000007D3'EF   DF  0276                          PUSHAL  T_PWRDN_ERROR
                        00   DD  027C                          PUSHL   #0
                        01   DD  027E                          PUSHL   #$ER
                                 0280        ;;; TEST 2, SUBTEST 4, ERROR 1
          000100D0 9F   04   FB  0280                          CALLS   #$$M, @#DS$ERRHARD
                                 0287   620          $DS_ABORT
          00010020 9F   6C   FA  0287                          CALLG   (AP), @#DS$ABORT
                                 028E   621 3$:
                                 028E   622          $DS_ENDSUB
                                 028E        T2_S4_X:
   00010038 9F   00000024'EF   FA  028E                          CALLG   $S$, @#DS$ENDSUB
                                 0299   623          $DS_CLRVEC_S    VECTOR=#SCB$L_POWER
                        0C   DD  0299                          PUSHL   #SCB$L_POWER
          00010168 9F   01   FB  029B                          CALLS   #1, @#DS$CLRVEC
                                 02A2   624          $DS_ENDTEST
                    50   01   D0  02A2                          MOVL    #1, R0          ; NORMAL EXIT
                                 02A5        TEST_002_X::
          00010058 9F   6E   FA  02A5                          CALLG   (SP), @#DS$BREAK
                             04  02AC                          RET                     ; RETURN TO TEST SEQUENCER
                                 02AD   625
                                 02AD   626          $DS_PAGE
```

```
                        02AD                .SBTTL  TEST 3:   POWER FAIL (BREAKER)
                    00000000                .PSECT  TEST_003, PAGE, NOWRT
                        001C
                        001C    629 ;++
                        001C    630 ; Test description:
                        001C    631 ;
                        001C    632 ;       This test consists of a series of manual operator intervention
                        001C    633 ;       subtests. These subtests are the same as in the last test but instead
                        001C    634 ;       of pushing the init switch to simulate the power failure, the breaker
                        001C    635 ;       on the back panel of the 11-750 is thrown causing a power failure.
                        001C    636 ;       The operator is asked if the system under test is equipped with a
                        001C    637 ;       battery backup. If a negative responce is received the test is exited
                        001C    638 ;       and the power fail test is complete.
                        001C    639 ;
                        001C    640 ;
                        001C    641 ; Assumptions:
                        001C    642 ;
                        001C    643 ;       For this test to function properly the right front panel select
                        001C    644 ;       switch must be in the HALT/RESTART position and the key switch
                        001C    645 ;       must be in the LOCAL position.
                        001C    646 ;
                        001C    647 ;--
                        001C    648
                        001C    649         $DS_BGNTEST     <MANUAL,POWER_FAIL,ALL>
                        001C        DATA_003:
                    00000000    001C                .LONG   0                   ; TEST ARGUMENT TABLE TERMINATOR
                        0020        TEST_003::
                        0000    0020                .WORD   ^M<>                ; ENTRY MASK
                        0022    650
                        0022    651         $DS_SETVEC_S    VECTOR=#SCB$L_POWER, SRVADR=POWER_DOWN, CODE=#1
                          01    DD  0022                  PUSHL   #1
                00000924'EF     DF  0024                  PUSHAL  POWER_DOWN
                          0C    DD  002A                  PUSHL   #SCB$L_POWER
                00010160 9F     03  FB  002C              CALLS   #3, a#DS$SETVEC
                        0033    652 2$:     $DS_ASKLGCL_S   MSGADR=T_BAT_BKUP, DATADR=B_RESPONCE, YEXFER=3$
                          00    DD  0033                  PUSHL   #0
                          00    DD  0035                  PUSHL   #PAR$_NO
                          00    DD  0037                  PUSHL   #0
                0000005A'EF     DF  0039                  PUSHAL  3$
                          00    DD  003F                  PUSHL   #0
                00000018'EF     DF  0041                  PUSHAL  B_RESPONCE
                00000692'EF     DF  0047                  PUSHAL  T_BAT_BKUP
                00010098 9F     07  FB  004D              CALLS   #7, a#DS$ASKLGCL
                        0054    653         $DS_EXIT        TEST
                          50    01  D0  0054                  MOVL    #1,R0           ; NOT AN ERROR
                            025F    31  0057                  BRW     TEST_003_X      ; EXIT TEST 3
                00000B20'EF     16  005A    654 3$:     JSB     CALC_CHECKSUM   ; calculate good checksum for RPB.
                        0060    655         $DS_PRINTF_S    FORMAT=T_INST
                00000021'EF     9F  0060                  PUSHAB  T_INST
                000100F0 9F     01  FB  0066              CALLS   #$$N, a#DS$PRINTF
                        006D    656         $DS_PAGE
```

```
                                006D                    .SBTTL  SUBTEST 3.1:  GOOD RPB SUBTEST
                                006D    659 ;+
                                006D    660 ; SUBTEST DESCRIPTION:
                                006D    661 ;
                                006D    662 ;       This subtest sets up a good RPB at location zero, which points to
                                006D    663 ;       a power up routine that restores all pertinent processor registers,
                                006D    664 ;       the argument pointer, frame pointer and stack pointer. The operator
                                006D    665 ;       is instructed through the console terminal to throw the circuit
                                006D    666 ;       breaker on the rear panel to cause a CPU power failure. If the
                                006D    667 ;       RPB is intrepreted properly the instrucions for the next subtest will
                                006D    668 ;       be printed on the console terminal. If an error occured, either the
                                006D    669 ;       processor will halt unexpectedly or an error report will be generated
                                006D    670 ;       by the diagnostic supervisor.
                                006D    671 ;
                                006D    672 ;
                                006D    673 ; SUBTEST STEPS:
                                006D    674 ;
                                006D    675 ;       SUBTEST GOOD RPB
                                006D    676 ;       :  Setup good RPB at location 0
                                006D    677 ;       :  Send instructions to operator
                                006D    678 ;       :  Recover from power fail
                                006D    679 ;       ENDSUBTEST GOOD RPB
                                006D    680 ;
                                006D    681 ;
                                006D    682 ; ERRORS:
                                006D    683 ;
                                006D    684 ;
                                006D    685 ; DEBUG:
                                006D    686 ;
                                006D    687 ;
                                006D    688 ;-
                                006D    689             $DS_BGNSUB
                                006D            T3_S1::
00010030 9F   00000030'EF   FA  006D                    CALLG   $S$, a#DS$BGNSUB
                                0078    690
          00000B3B'EF       16  0078    691             JSB     CLEAR_BUFFER    ; clear buffer area
          00000019'EF       94  007E    692             CLRB    B_FLAGS         ; initialize flags
          0000001A'EF       94  0084    693             CLRB    B_FLAGS2        ; init flags2
              55    00      D0  008A    694             MOVL    #0,R5           ; load address to build RPB
              85    00      D0  008D    695             MOVL    #0,(R5)+        ; load first longword with the address
       85 000009CC'EF       DE  0090    696             MOVAL   POWER_UP,(R5)+  ; load address of restart routine
       85 00000008'EF       D0  0097    697             MOVL    L_CHECKSUM,(R5)+ ; load good restart routine checksum
                 65         D4  009E    698             CLRL    (R5)            ; clear warm start flag
                                00A0    699             $DS_PRINTF_S    FORMAT=T_MESSAGE_5
          00000352'EF       9F  00A0                    PUSHAB  T_MESSAGE_5
       000100F0 9F          01  FB  00A6                CALLS   #$$N, a#DS$PRINTF
                                00AD    700
                                00AD    701 POWER_DOWN_5:
                                00AD    702             $DS_BREAK
    00010058 9F             6E  FA  00AD                CALLG   (SP), a#DS$BREAK
 02 00000019'EF             01  E0  00B4    703             BBS     #V_PWRUP_DONE,B_FLAGS,1$ ; br = power up sequence complete
                            EF  11  00BC    704             BRB     POWER_DOWN_5    ; wait for power fail interrupt
                                00BE    705
 1A 00000019'EF             00  E0  00BE    706 1$:         BBS     #V_PWRDN_DONE,B_FLAGS,3$ ; br = power down sequence complete
                                00C6    707             $DS_ERRHARD_S   UNIT=#0, MSGADR=T_PWRDN_ERROR
```

```
                        00   DD  00C6                          PUSHL   #0
                000007D3'EF   DF  00C8                          PUSHAL  T_PWRDN_ERROR
                        00   DD  00CE                          PUSHL   #0
                        01   DD  00D0                          PUSHL   #$ER
                                 00D2        ;;; TEST 3, SUBTEST 1, ERROR 1
          000100D0 9F   04   FB  00D2                          CALLS   #$$M, @#DS$ERRHARD
                                 00D9   708          $DS_ABORT
          00010020 9F   6C   FA  00D9                          CALLG   (AP), @#DS$ABORT
                                 00E0   709 3$:
                                 00E0   710
                                 00E0   711          $DS_ENDSUB
                                 00E0        T3_S1_X:
   00010038 9F   00000030'EF   FA  00E0                          CALLG   $S$, @#DS$ENDSUB
                                 00EB   712
                                 00EB   713          $DS_PAGE
```

```
                                00EB                    .SBTTL  SUBTEST 3.2:  BAD CHECKSUM SUBTEST
                                00EB    716 ;+
                                00EB    717 ; SUBTEST DESCRIPTION:
                                00EB    718 ;
                                00EB    719 ;       This subtest sets up an RPB at location zero with a bad checksum.
                                00EB    720 ;       It points to a power up routine that restores all pertinent processor
                                00EB    721 ;       registers, the argument pointer, frame pointer and stack pointer.
                                00EB    722 ;       The operator is instructed through the console terminal to throw the
                                00EB    723 ;       circuit breaker the rear panel to cause a CPU power failure,
                                00EB    724 ;       check the halt code, and start a the indicated location. If the RPB is
                                00EB    725 ;       intrepreted properly a halt code of 11 will be printed on the console
                                00EB    726 ;       terminal. At this point the machine will be in console mode and the
                                00EB    727 ;       operator should type "S 100" followed by a carrage return to continue
                                00EB    728 ;       testing. If the expected halt code is not printed on the console
                                00EB    729 ;       terminal then an error has occured.
                                00EB    730 ;
                                00EB    731 ;
                                00EB    732 ; SUBTEST STEPS:
                                00EB    733 ;
                                00EB    734 ;       SUBTEST BAD CHECKSUM
                                00EB    735 ;       :  Setup RPB at location 0 with bad checksum
                                00EB    736 ;       :  Send instructions to operator
                                00EB    737 ;       :  Recover from fatal power fail
                                00EB    738 ;       ENDSUBTEST BAD CHECKSUM
                                00EB    739 ;
                                00EB    740 ;
                                00EB    741 ; ERRORS:
                                00EB    742 ;
                                00EB    743 ;
                                00EB    744 ; DEBUG:
                                00EB    745 ;
                                00EB    746 ;
                                00EB    747 ;-
                                00EB    748             $DS_BGNSUB
                                00EB                    T3_S2::
00010030 9F   0000003C'EF   FA  00EB                            CALLG   $S$, a#DS$BGNSUB
              00000B3B'EF   16  00F6    749           JSB     CLEAR_BUFFER    ; clear buffer area
              00000019'EF   94  00FC    750           CLRB    B_FLAGS         ; initialize flags
              0000001A'EF   94  0102    751           CLRB    B_FLAGS2        ; init flags2
                  55   00   D0  0108    752           MOVL    #0,R5           ; load address to build RPB
                  85   00   D0  010B    753           MOVL    #0,(R5)+        ; load first longword with the address
          85  000009CC'EF   DE  010E    754           MOVAL   POWER_UP,(R5)+  ; load address of restart routine
          65  00000008'EF   D0  0115    755           MOVL    L_CHECKSUM,(R5) ; load good restart routine checksum
                  85   01   C2  011C    756           SUBL2   #1,(R5)+        ; make the checksum bad
                       65   D4  011F    757           CLRL    (R5)            ; clear warm start flag
00000100'EF   0000001B'EF   7D  0121    758           MOVQ    JUMP,STRTUP     ; load addr 100 with JMP to restart test
                            012C    759           $DS_PRINTF_S    FORMAT=T_MESSAGE_6
              000003EC'EF   9F  012C                            PUSHAB  T_MESSAGE_6
          000100F0 9F   01  FB  0132                            CALLS   #$$N, a#DS$PRINTF
                            0139    760
                            0139    761 POWER_DOWN_6:
                            0139    762             $DS_BREAK
          00010058 9F   6E  FA  0139                            CALLG   (SP), a#DS$BREAK
       02 00000019'EF   01  E0  0140    763           BBS     #V_PWRUP_DONE,B_FLAGS,1$ ; br = power up sequence complete
                        EF  11  0148    764           BRB     POWER_DOWN_6    ; wait for power fail interrupt
```

```
                                  014A   765
        1A 00000019'EF   00   E0  014A   766 1$:     BBS     #V_PWRDN_DONE,B_FLAGS,3$ ; br = power down sequence complete
                                  0152   767         $DS_ERRHARD_S   UNIT=#0, MSGADR=T_PWRDN_ERROR
                         00   DD  0152                     PUSHL   #0
                000007D3'EF   DF  0154                     PUSHAL  T_PWRDN_ERROR
                         00   DD  015A                     PUSHL   #0
                         01   DD  015C                     PUSHL   #$ER
                                  015E       ;;; TEST 3, SUBTEST 2, ERROR 1
           000100D0 9F   04   FB  015E                     CALLS   #$$M, @#DS$ERRHARD
                                  0165   768         $DS_ABORT
           00010020 9F   6C   FA  0165                     CALLG   (AP), @#DS$ABORT
                                  016C   769 3$:
                                  016C   770         $DS_ENDSUB
                                  016C       T3_S2_X:
    00010038 9F   0000003C'EF   FA  016C                     CALLG   $S$, @#DS$ENDSUB
                                  0177   771
                                  0177   772         $DS_PAGE
                                  0177   773
```

```
                                0177                    .SBTTL  SUBTEST 3.3:  SEARCH FOR GOOD RPB
                                0177    776 ;+
                                0177    777 ; SUBTEST DESCRIPTION:
                                0177    778 ;
                                0177    779 ;       This subtest sets up an RPB at location zero with a bad checksum.
                                0177    780 ;       It also sets up a good RPB at a higher page boundary which points
                                0177    781 ;       to a power up routine that restores all pertinent processor
                                0177    782 ;       registers, the argument pointer, frame pointer and stack pointer.
                                0177    783 ;       The operator is instructed through the console terminal to throw the
                                0177    784 ;       circuit breaker on the rear panel to cause a CPU power failure.
                                0177    785 ;       If the RPB is intrepreted properly the next subtest instructions will
                                0177    786 ;       be printed on the console terminal. If an error occured, either the
                                0177    787 ;       processor will halt unexpectedly or an error report will be generated
                                0177    788 ;       by the diagnostic supervisor.
                                0177    789 ;
                                0177    790 ;
                                0177    791 ; SUBTEST STEPS:
                                0177    792 ;
                                0177    793 ;       SUBTEST SEARCH FOR GOOD RPB
                                0177    794 ;       :  Setup RPB at location 0 with bad checksum
                                0177    795 ;       :  Setup good RPB at higher page boundary
                                0177    796 ;       :  Send instructions to operator
                                0177    797 ;       ENDSUBTEST SEARCH FOR GOOD RPB
                                0177    798 ;
                                0177    799 ;
                                0177    800 ; ERRORS:
                                0177    801 ;
                                0177    802 ;
                                0177    803 ; DEBUG:
                                0177    804 ;
                                0177    805 ;
                                0177    806 ;-
                                0177    807             $DS_BGNSUB
                                0177            T3_S3::
00010030 9F    00000048'EF   FA 0177                            CALLG   $S$, a#DS$BGNSUB
         00000B3B'EF   16  0182    808            JSB     CLEAR_BUFFER    ; clear buffer area
         00000019'EF   94  0188    809            CLRB    B_FLAGS         ; initialize flags
         0000001A'EF   94  018E    810            CLRB    B_FLAGS2        ; init flags2
             55   00   D0  0194    811            MOVL    #0,R5           ; load address to build bad RPB
             85   00   D0  0197    812            MOVL    #0,(R5)+        ; load first longword with the address
      85 000009CC'EF   DE  019A    813            MOVAL   POWER_UP,(R5)+  ; load address of restart routine
      65 00000008'EF   D0  01A1    814            MOVL    L_CHECKSUM,(R5) ; load good restart routine checksum
             85   01   C0  01A8    815            ADDL2   #1,(R5)+        ; make checksum bad
                  65   D4  01AB    816            CLRL    (R5)            ; clear warm start flag
      55 00000000'FF   DE  01AD    817            MOVAL   @A_BUFFER_BEGIN,R5 ; load address to build good RPB
      85 00000000'FF   DE  01B4    818            MOVAL   @A_BUFFER_BEGIN,(R5)+ ; load first longword with the address
      85 000009CC'EF   DE  01BB    819            MOVAL   POWER_UP,(R5)+  ; load address of restart routine
      85 00000008'EF   D0  01C2    820            MOVL    L_CHECKSUM,(R5)+ ; load good restart routine checksum
                  65   D4  01C9    821            CLRL    (R5)            ; clear warm start flag
                           01CB    822            $DS_PRINTF_S    FORMAT=T_MESSAGE_7
         000004D0'EF   9F  01CB                            PUSHAB  T_MESSAGE_7
   000100F0 9F    01   FB  01D1                            CALLS   #$$N, a#DS$PRINTF
                           01D8    823
                           01D8    824 POWER_DOWN_7:
                           01D8    825            $DS_BREAK
```

```
                00010058 9F    6E    FA  01D8                          CALLG   (SP), a#DS$BREAK
             02 00000019'EF    01    E0  01DF    826          BBS     #V_PWRUP_DONE,B_FLAGS,1$ ; br = power up sequence complete
                               EF    11  01E7    827          BRB     POWER_DOWN_7    ; wait for power fail interrupt
                                         01E9    828
             1A 00000019'EF    00    E0  01E9    829 1$:      BBS     #V_PWRDN_DONE,B_FLAGS,3$ ; br = power down sequence complete
                                         01F1    830          $DS_ERRHARD_S   UNIT=#0, MSGADR=T_PWRDN_ERROR
                               00    DD  01F1                          PUSHL   #0
                     000007D3'EF     DF  01F3                          PUSHAL  T_PWRDN_ERROR
                               00    DD  01F9                          PUSHL   #0
                               01    DD  01FB                          PUSHL   #$ER
                                         01FD        ;;; TEST 3, SUBTEST 3, ERROR 1
                00010DD0 9F    04    FB  01FD                          CALLS   #$$M, a#DS$ERRHARD
                                         0204    831          $DS_ABORT
                00010020 9F    6C    FA  0204                          CALLG   (AP), a#DS$ABORT
                                         020B    832 3$:
                                         020B    833          $DS_ENDSUB
                                         020B        T3_S3_X:
            00010038 9F    00000048'EF    FA  020B                      CALLG   $S$, a#DS$ENDSUB
                                         0216    834
                                         0216    835          $DS_PAGE
                                         0216    836
```

```
                        0216                    .SBTTL  SUBTEST 3.4:  WARM START FLAG SUBTEST
                        0216    839 ;+
                        0216    840 ; SUBTEST DESCRIPTION:
                        0216    841 ;
                        0216    842 ;       This subtest sets up an RPB at location zero with the warm start flag
                        0216    843 ;       set. The RPB points to a power up routine that restores all pertinent
                        0216    844 ;       processor registers, the argument pointer, frame pointer and stack
                        0216    845 ;       pointer. The operator is instructed through the console terminal to
                        0216    846 ;       throw the circuit breaker on the rear panel to cause a CPU power
                        0216    847 ;       failure, check the halt code, and start at location 100. If the RPB is
                        0216    848 ;       interpreted properly a halt code of 12 will be printed on the console
                        0216    849 ;       terminal. At this point the machine will be in console mode and the
                        0216    850 ;       operator should type "S 100" followed by a carrage return to continue
                        0216    851 ;       testing. If the expected halt code is not printed on the console
                        0216    852 ;       terminal then an error has occured and the warm start flag was not
                        0216    853 ;       recognized.
                        0216    854 ;
                        0216    855 ; SUBTEST STEPS:
                        0216    856 ;
                        0216    857 ;       SUBTEST WARM START FLAG
                        0216    858 ;       :  Setup RPB at location 0 with warm start flag set
                        0216    859 ;       :  Send instructions to operator
                        0216    860 ;       :  Recover from fatal power fail
                        0216    861 ;       ENDSUBTEST WARM START FLAG
                        0216    862 ;
                        0216    863 ; ERRORS:
                        0216    864 ;
                        0216    865 ;
                        0216    866 ; DEBUG:
                        0216    867 ;
                        0216    868 ;
                        0216    869 ;-
                        0216    870             $DS_BGNSUB
                        0216                    T3_S4::
00010030 9F   00000054'EF   FA  0216                    CALLG   $S$, a#DS$BGNSUB
              00000B3B'EF   16  0221    871             JSB     CLEAR_BUFFER    ; clear buffer area
              00000019'EF   94  0227    872             CLRB    B_FLAGS         ; initialize flags
              0000001A'EF   94  022D    873             CLRB    B_FLAGS2        ; init flags2
                  55    00    D0  0233    874             MOVL    #0,R5           ; load address to build RPB
                  85    00    D0  0236    875             MOVL    #0,(R5)+        ; load first longword with the address
          85  000009CC'EF   DE  0239    876             MOVAL   POWER_UP,(R5)+  ; load address of restart routine
          85  00000008'EF   D0  0240    877             MOVL    L_CHECKSUM,(R5)+ ; load good restart routine checksum
                  65    01    D0  0247    878             MOVL    #1,(R5)         ; clear warm start flag
00000100'EF   0000001B'EF   7D  024A    879             MOVQ    JUMP,STRTUP     ; load location 100 with jump instruction
                        0255    880             $DS_PRINTF_S    FORMAT=T_MESSAGE_8
              00000568'EF   9F  0255                    PUSHAB  T_MESSAGE_8
          000100F0 9F       01  FB  025B                CALLS   #$$N, a#DS$PRINTF
                        0262    881             $DS_PRINTF_S    FORMAT=T_SWITCH
              00000651'EF   9F  0262                    PUSHAB  T_SWITCH
          000100F0 9F       01  FB  0268                CALLS   #$$N, a#DS$PRINTF
                        026F    882 POWER_DOWN_8:
                        026F    883             $DS_BREAK
          00010058 9F       6E  FA  026F                CALLG   (SP), a#DS$BREAK
       02 00000019'EF       01  E0  0276    884             BBS     #V_PWRUP_DONE,B_FLAGS,1$ ; br = power up sequence complete
                            EF  11  027E    885             BRB     POWER_DOWN_8    ; wait for power fail interrupt
```

```
                                0280   886
          1A 00000019'EF   00   E0  0280   887 1$:     BBS     #V_PWRDN_DONE,B_FLAGS,3$ ; br = power down sequence complete
                                0288   888         $DS_ERRHARD_S   UNIT=#0, MSGADR=T_PWRDN_ERROR
                             00 DD  0288                 PUSHL   #0
                   000007D3'EF  DF  028A                 PUSHAL  T_PWRDN_ERROR
                             00 DD  0290                 PUSHL   #0
                             01 DD  0292                 PUSHL   #$ER
                                0294       ;;; TEST 3, SUBTEST 4, ERROR 1
               000100D0 9F   04 FB  0294                 CALLS   #$$M, a#DS$ERRHARD
                                029B   889         $DS_ABORT
               00010020 9F   6C FA  029B                 CALLG   (AP), a#DS$ABORT
                                02A2   890 3$:
                                02A2   891
                                02A2   892         $DS_ENDSUB
                                02A2       T3_S4_X:
          00010038 9F   00000054'EF FA  02A2                 CALLG   $S$, a#DS$ENDSUB
                                02AD   893
                                02AD   894         $DS_CLRVEC_S    VECTOR=#SCB$L_POWER
                             0C DD  02AD                 PUSHL   #SCB$L_POWER
               00010168 9F   01 FB  02AF                 CALLS   #1, a#DS$CLRVEC
                                02B6   895
                                02B6   896 ;       $DS_ENDTEST     ;ELIMINATED DUE TO EXTRA CODE NEEDED, VERSION 3.4
                          50   01 D0  02B6   897         MOVL    #1,R0                   ; NORMAL EXIT
                                02B9   898 TEST_003_X::
               00010058 9F   6E FA  02B9   899         CALLG   (SP),a#DS$BREAK
                          19   00 DA  02C0   900         MTPR    #0,#^X19                ; CLEAR THE NICR
               18   80000090 8F   DA  02C3   901         MTPR    #^X80000090,#^X18       ; TRANSFER NICR TO ICR, MAKE SURE
                                02CA   902                                             ; IR AND ERROR ARE CLEAR
                             04 02CA   903         RET                                   ; RETURN
                                02CB   904
                                02CB   905         $DS_ENDMOD
                          00000000                         .PSECT  $TSTCNT, NOEXE, NOWRT, OVR, LONG
                      00000002  0000                       .LONG   $TN
                                0004   906
                                0004   907         .END
```

```
$$$                     = 00000054 R      05
$$E                     = 00000001
$$M                     = 00000004
$$N                     = 00000000
$$S                     = 00000004
$ENV                    = 00000001  G
$ER                     = 00000001
$MO                     = 00000001  G
$S$                     = 00000054 R      05
$ST                     = FFFFFFFF
$TN                     = 00000002
ALL                     = 00000009  G
A_BUFFER_BEGIN            ********    X   01
A_PWR_BUFFER              ********    X   01
BASE_002                  00000000 R      03
BASE_003                  00000000 R      06
B_FLAGS                   00000019 R      01
B_FLAGS2                  0000001A R      01
B_RESPONCE                00000018 R      01
CALC_CHECKSUM             00000B20 R      01
CEP_FUNCTIONAL          = 00000000
CEP_REPAIR              = 00000001
CLEAR_BUFFER              00000B3B R      01
DATA_002                  00000020 R      03
DATA_003                  0000001C R      06
DEFAULT                 = 00000000  G
DS$ABORT                  00010020
DS$ASKADR                 00010090
DS$ASKDATA                00010080
DS$ASKLGCL                00010098
DS$ASKSTR                 000100A0
DS$ASKVLD                 00010088
DS$ATTACH                 000101A8
DS$BGNSUB                 00010030
DS$BRANCH                 000100A8
DS$BREAK                  00010058
DS$CANWAIT                00010070
DS$CHANNEL                00010180
DS$CKLOOP                 00010040
DS$CLRVEC                 00010168
DS$CNTRLC                 00010078
DS$CVTREG                 000100B0
DS$ENDPASS                00010010
DS$ENDSUB                 00010038
DS$ERRDEV                 000100C8
DS$ERRHARD                000100D0
DS$ERRPREP                00010108
DS$ERRSOFT                000100D8
DS$ERRSYS                 000100C0
DS$ESCAPE                 00010050
DS$FREEDBGSYM             000101B8
DS$GETBUF                 00010120
DS$GETMEM                 00010130
DS$GETTERM                000101C8
DS$GPHARD                 00010018
DS$HELP                   000101B0
DS$INITSCB                00010170
DS$INLOOP                 00010048
DS$K_ERROR              = 00000002
DS$K_NORMAL             = 00000001
DS$K_SEVERE             = 00000004
DS$K_SUBSYS             = 00000066
DS$K_WARNING            = 00000000
DS$LOAD                   00010198
DS$LOADPCS                000101C0
DS$MAPDBGBLOCK            00010118
DS$MEMSIZE                000101D8
DS$MMOFF                  00010158
DS$MMON                   00010150
DS$MOVPHY                 00010148
DS$MOVVRT                 00010140
DS$PARSE                  000100B8
DS$PRINTB                 000100E0
DS$PRINTF                 000100F0
DS$PRINTS                 000100F8
DS$PRINTSIG               00010100
DS$PRINTX                 000100E8
DS$PROBE                  000101A0
DS$RELBUF                 00010128
DS$RELMEM                 00010138
DS$SERVICE_DISPATCHER     000101D0
DS$SETIPL                 00010178
DS$SETMAP                 00010188
DS$SETPRIEXV              00010110
DS$SETVEC                 00010160
DS$SHOCHAN                00010190
DS$SUMMARY                00010028
DS$WAITMS                 00010060
DS$WAITUS                 00010068
DS$_ARITH               = 006600D0
DS$_ASBE                = 00660118
DS$_BADLINK             = 006600F0
DS$_BADTYPE             = 006600E8
DS$_BIIC                = 00660120
DS$_CHME                = 006600A8
DS$_CHMK                = 006600E0
DS$_DEVNAME             = 00660108
DS$_ERROR               = 00660002
DS$_FHWE                = 00660068
DS$_FRAGBUF             = 00660080
DS$_ICBUSY              = 006600C8
DS$_ICERR               = 006600C0
DS$_IHWE                = 00660060
DS$_ILLCHAR             = 00660018
DS$_ILLPAGCNT           = 00660078
DS$_ILLUNIT             = 00660100
DS$_INSFMEM             = 00660050
DS$_IPL2HI              = 006600B8
DS$_IVADDR              = 00660040
DS$_IVVECT              = 00660038
```

```
DS$_KRNLSTK                     = 00660090
DS$_LOGIC                       = 00660070
DS$_MCHK                        = 00660088
DS$_MMOFF                       = 00660058
DS$_NEEDUNIT                    = 006600F8
DS$_NODE                        = 00660128
DS$_NOPCS                       = 00660110
DS$_NORMAL                      = 00660001
DS$_NOSUPPORT                   = 006600B1
DS$_NOTDON                      = 00660030
DS$_NOTIMP                      = 006600B0
DS$_NULLSTR                     = 00660010
DS$_OVERFLOW                    = 00660008
DS$_POWER                       = 00660098
DS$_PROGERR                     = 00660020
DS$_SEVERE                      = 00660004
DS$_TRANSL                      = 006600A0
DS$_TRUNCATE                    = 00660028
DS$_UNEXPINT                    = 006600D8
DS$_VASFULL                     = 00660048
DS$_WARNING                     = 00660000
DSA$AL_APTMAIL                    0000FE00
DSA$AT_APTTXT                     0000FA00
DSA$GL_APTCOM                     0000FE04
DSA$GL_DEVLEN                     0000FE58
DSA$GL_ERRNO                      0000FE44
DSA$GL_EVENT                      0000FE48
DSA$GL_FLAGS                      0000FE00
DSA$GL_MSGTYP                     0000FE40
DSA$GL_PASSES                     0000FE08
DSA$GL_PASSNO                     0000FE54
DSA$GL_SECTNO                     0000FE10
DSA$GL_SID                        0000FE14
DSA$GL_SUBTNO                     0000FE4C
DSA$GL_TESTNO                     0000FE50
DSA$GL_UNITS                      0000FE0C
DSA$GQ_MSGPTR                     0000FE68
DSA$GT_DEVNAM                     0000FE5C
DSA$V_OPER                      = 0000000C
ENV$M_DOMAIN                    = 00000002
ENV$M_LEVEL                     = 00000001
ENV$M_SUPER                     = 000003FC
ENV$S_DOMAIN                    = 00000001
ENV$S_LEVEL                     = 00000001
ENV$S_SUPER                     = 00000008
ENV$V_DOMAIN                    = 00000001
ENV$V_LEVEL                     = 00000000
ENV$V_SUPER                     = 00000002
ENV$_CPU                        = 00000000
ENV$_FUNCTIONAL                 = 00000000
ENV$_REPAIR                     = 00000001
ENV$_SUPER                      = 00000001
ENV$_SYSTEM                     = 00000001
HALT                            = 00000004  G
IPR                             = 00000006  G
JUMP                              0000001B R      01
L_BUF_BEGIN                       00000000 R      01
L_CHECKSUM                        00000008 R      01
L_COUNT                           00000004 R      01
L_IS_SP                           00000010 R      01
L_KS_SP                           00000014 R      01
L_PSL                             0000000C R      01
MANUAL                          = 00000001  G
MCHK                            = 00000005  G
MSG_002                           00000002 R      03
MSG_003                           00000002 R      06
M_BADMODE_DN                    = 00000001
M_BADMODE_UP                    = 00000002
M_BADSTACK_DN                   = 00000004
M_BADSTACK_UP                   = 00000008
M_BAD_PC                        = 00000004
M_PWRDN_DONE                    = 00000001
M_PWRUP_DONE                    = 00000002
PAR$M_ATDEF                     = 00000010
PAR$M_ATHI                      = 00000008
PAR$M_ATLO                      = 00000004
PAR$M_NODEF                     = 00000002
PAR$V_ATDEF                     = 00000004
PAR$V_ATHI                      = 00000003
PAR$V_ATLO                      = 00000002
PAR$V_NODEF                     = 00000001
PAR$_BIN                        = 00000002
PAR$_DEC                        = 0000000A
PAR$_HEX                        = 00000010
PAR$_NO                         = 00000000
PAR$_OCT                        = 00000008
PAR$_YES                        = 00000001
PCS                             = 00000008  G
POWER_DOWN                        00000924 R      01
POWER_DOWN_1                      000000A6 R      03
POWER_DOWN_2                      00000132 R      03
POWER_DOWN_3                      000001D1 R      03
POWER_DOWN_4                      0000025B R      03
POWER_DOWN_5                      000000AD R      06
POWER_DOWN_6                      00000139 R      06
POWER_DOWN_7                      000001D8 R      06
POWER_DOWN_8                      0000026F R      06
POWER_FAIL                      = 00000003  G
POWER_UP                          000009CC R      01
PR$_ASTLVL                        ********   X    01
PR$_ESP                           ********   X    01
PR$_ISP                           ********   X    01
PR$_KSP                           ********   X    01
PR$_P0BR                          ********   X    01
PR$_P0LR                          ********   X    01
PR$_P1BR                          ********   X    01
PR$_P1LR                          ********   X    01
PR$_PCBB                          ********   X    01
PR$_SBR                           ********   X    01
PR$_SCBB                          ********   X    01
```

```
PR$_SLR                 ********   X   01        SEP_REPAIR                      = 00000003
PR$_SSP                 ********   X   01        SIZ...                          = 00000001
PR$_USP                 ********   X   01        STRTUP                          = 00000100
PSL$K_EXEC            = 00000001                 SYS$ALLOC                         00010238
PSL$K_KERNEL          = 00000000                 SYS$ASCTIM                        00010248
PSL$K_SUPER           = 00000002                 SYS$ASSIGN                        00010250
PSL$K_USER            = 00000003                 SYS$BINTIM                        00010258
PSL$M_CBIT            = 00000001                 SYS$CANCEL                        00010260
PSL$M_NBIT            = 00000008                 SYS$CANTIM                        00010268
PSL$M_VBIT            = 00000002                 SYS$CLOSE                         000105B8
PSL$M_ZBIT            = 00000004                 SYS$CLREF                         00010298
PSL$S_CURMOD          = 00000002                 SYS$CONNECT                       000105C0
PSL$V_CBIT            = 00000000                 SYS$DALLOC                        000102D8
PSL$V_CURMOD          = 00000018                 SYS$DASSGN                        000102E0
PSL$V_IS              = 0000001A                 SYS$DISCONNECT                    000105D0
PSL$V_NBIT            = 00000003                 SYS$FAO                           00010350
PSL$V_VBIT            = 00000001                 SYS$FAOL                          00010358
PSL$V_ZBIT            = 00000002                 SYS$GET                           00010580
SCB$L_ACCESS            00000020                 SYS$GETCHN                        000104C8
SCB$L_ARITH             00000034                 SYS$GETTIM                        00010378
SCB$L_BREAK             0000002C                 SYS$LKWSET                        000103A0
SCB$L_CHME              00000044                 SYS$NUMTIM                        000103B8
SCB$L_CHMK              00000040                 SYS$OPEN                          00010608
SCB$L_CHMS              00000048                 SYS$QIO                           000103C8
SCB$L_CHMU              0000004C                 SYS$QIOW                          00010200
SCB$L_COMPAT            00000030                 SYS$READ                          00010590
SCB$L_KNLSTK            00000008                 SYS$READEF                        000103D0
SCB$L_MACHCHK           00000004                 SYS$SETAST                        000103F8
SCB$L_OPCCUS            00000014                 SYS$SETEF                         00010400
SCB$L_OPCDEC            00000010                 SYS$SETIMR                        00010420
SCB$L_POWER             0000000C                 SYS$SETPRI                        00010428
SCB$L_RADRMOD           0000001C                 SYS$SETPRT                        00010430
SCB$L_ROPRAND           00000018                 SYS$SETRWM                        00010438
SCB$L_RXDB              000000F8                 SYS$SETSWM                        00010448
SCB$L_SFTLVL1           00000084                 SYS$ULKPAG                        00010460
SCB$L_SFTLVL10          000000A8                 SYS$ULWSET                        00010468
SCB$L_SFTLVL11          000000AC                 SYS$UNWIND                        00010470
SCB$L_SFTLVL12          000000B0                 SYS$WAITFR                        00010478
SCB$L_SFTLVL13          000000B4                 SYS$WFLAND                        00010488
SCB$L_SFTLVL14          000000B8                 SYS$WFLOR                         00010490
SCB$L_SFTLVL15          000000BC                 T2_S1                             00000066 RG     03
SCB$L_SFTLVL2           00000088                 T2_S1_X                           000000D9 R      03
SCB$L_SFTLVL3           0000008C                 T2_S2                             000000E4 RG     03
SCB$L_SFTLVL4           00000090                 T2_S2_X                           00000165 R      03
SCB$L_SFTLVL5           00000094                 T2_S3                             00000170 RG     03
SCB$L_SFTLVL6           00000098                 T2_S3_X                           00000204 R      03
SCB$L_SFTLVL7           0000009C                 T2_S4                             0000020F RG     03
SCB$L_SFTLVL8           000000A0                 T2_S4_X                           0000028E R      03
SCB$L_SFTLVL9           000000A4                 T3_S1                             0000006D RG     06
SCB$L_TBIT              00000028                 T3_S1_X                           000000E0 R      06
SCB$L_TIMER             000000C0                 T3_S2                             000000EB RG     06
SCB$L_TRANSL            00000024                 T3_S2_X                           0000016C R      06
SCB$L_TXDB              000000FC                 T3_S3                             00000177 RG     06
SCB$L_ZERO              00000000                 T3_S3_X                           0000020B R      06
SEP_FUNCTIONAL        = 00000002                 T3_S4                             00000216 RG     06
```

```
T3_S4_X                         000002A2 R      06
TEST_002                        00000024 RG     03
TEST_002_X                      000002A5 RG     03
TEST_003                        00000020 RG     06
TEST_003_X                      000002B9 RG     06
TU58                          = 00000002  G
T_BADMODE                       0000081B R      01
T_BADMODE_DN                    00000843 R      01
T_BADMODE_UP                    0000086D R      01
T_BADSTACK                      00000895 R      01
T_BADSTACK_DN                   000008C4 R      01
T_BADSTACK_UP                   000008F5 R      01
T_BAT_BKUP                      00000692 R      01
T_INST                          00000021 R      01
T_MESSAGE_1                     00000063 R      01
T_MESSAGE_2                     000000F9 R      01
T_MESSAGE_3                     000001D9 R      01
T_MESSAGE_4                     0000026D R      01
T_MESSAGE_5                     00000352 R      01
T_MESSAGE_6                     000003EC R      01
T_MESSAGE_7                     000004D0 R      01
T_MESSAGE_8                     00000568 R      01
T_NO_OPER                       0000073A R      01
T_PWRDN_ERROR                   000007D3 R      01
T_PWRUP_ERROR                   000007F8 R      01
T_PWRUP_FAILURE                 00000704 R      01
T_SWITCH                        00000651 R      01
V_BADMODE_DN                  = 00000000
V_BADMODE_UP                  = 00000001
V_BADSTACK_DN                 = 00000002
V_BADSTACK_UP                 = 00000003
V_BAD_PC                      = 00000002
V_PWRDN_DONE                  = 00000000
V_PWRUP_DONE                  = 00000001
WCS                           = 00000007  G
```

Psect synopsis

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
ECKAXC	00000B53 (2899.)	01 (1.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
ABS	00010610 (67088.)	02 (2.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE
TEST_002	000002AD (685.)	03 (3.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
DISPATCH	00000030 (48.)	04 (4.)	NOPIC USR CON REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG
ARGLIST	00000060 (96.)	05 (5.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC LONG
TEST_003	000002CB (715.)	06 (6.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
$TSTCNT	00000004 (4.)	07 (7.)	NOPIC USR OVR REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG

Symbol Cross Reference

SYMBOL	VALUE	DEFINITION		REFERENCES...							
$$$	=00000054-R	870	(15)	424	(7)	482	(8)	540	(9)	602	(10)
				689	(12)	748	(13)	807	(14)	870	(15)
$$E	=00000001	870	(15)	445	(7)	504	(8)	566	(9)	622	(10)
				711	(12)	770	(13)	833	(14)	892	(15)
$$M	=00000004	888	(15)	315	(5)	318	(5)	320	(5)	324	(5)
				327	(5)	329	(5)	383	(6)	442	(7)
				501	(8)	563	(9)	619	(10)	649	(11)
				707	(12)	767	(13)	830	(14)	888	(15)
$$N	=00000000	888	(15)	315	(5)	318	(5)	320	(5)	324	(5)
				327	(5)	329	(5)	#-385	(6)	#-390	(6)
				#-434	(7)	442	(7)	#-493	(8)	501	(8)
				#-555	(9)	563	(9)	#-612	(10)	619	(10)
				#-655	(11)	#-699	(12)	707	(12)	#-759	(13)
				767	(13)	#-822	(14)	830	(14)	#-880	(15)
				#-881	(15)	888	(15)	91	(3)		
$$S	=00000004	870	(15)	359	(6)	383	(6)	393	(7)	424	(7)
				449	(8)	482	(8)	508	(9)	540	(9)
				570	(10)	602	(10)	628	(11)	649	(11)
				658	(12)	689	(12)	715	(13)	748	(13)
				775	(14)	807	(14)	838	(15)	870	(15)
$ENV	=00000001	72	(3)								
$ER	=00000001	892	(15)	#-315	(5)	#-318	(5)	#-320	(5)	#-324	(5)
				#-327	(5)	#-329	(5)	424	(7)	#-442	(7)
				482	(8)	#-501	(8)	540	(9)	#-563	(9)
				602	(10)	#-619	(10)	689	(12)	#-707	(12)
				748	(13)	#-767	(13)	807	(14)	#-830	(14)
				870	(15)	#-888	(15)				
$MO	=00000001	905	(15)	905	(15)						
S	=00000054-R	870	(15)	424	(7)	445	(7)	482	(8)	504	(8)
				540	(9)	566	(9)	602	(10)	622	(10)
				689	(12)	711	(12)	748	(13)	770	(13)
				807	(14)	833	(14)	870	(15)	892	(15)
$ST	=FFFFFFFF	892	(15)	315	(5)	318	(5)	320	(5)	324	(5)
				327	(5)	329	(5)	383	(6)	393	(7)
				424	(7)	442	(7)	445	(7)	449	(8)
				482	(8)	501	(8)	504	(8)	508	(9)
				540	(9)	563	(9)	566	(9)	570	(10)
				602	(10)	619	(10)	622	(10)	624	(10)
				649	(11)	658	(12)	689	(12)	707	(12)
				711	(12)	715	(13)	748	(13)	767	(13)
				770	(13)	775	(14)	807	(14)	830	(14)
				833	(14)	838	(15)	870	(15)	888	(15)
				892	(15)						
$TN	=00000002	905	(15)	315	(5)	318	(5)	320	(5)	324	(5)
				327	(5)	329	(5)	359	(6)	383	(6)
				393	(7)	442	(7)	449	(8)	501	(8)
				508	(9)	563	(9)	570	(10)	619	(10)
				624	(10)	628	(11)	649	(11)	653	(11)

```
                                                    658    (12)    707    (12)    715    (13)    767    (13)
                                                    775    (14)    830    (14)    838    (15)    888    (15)
                                                    905    (15)
ALL                      =00000009    91    (3)     383    (6)     649    (11)
A_BUFFER_BEGIN            00000000-XR                350    (5)     550    (9)     551    (9)     817    (14)
                                                    818    (14)
A_PWR_BUFFER              00000000-XR                246    (5)
BASE_002                  00000000-R   359   (6)     383    (6)
BASE_003                  00000000-R   628   (11)    649    (11)
BIT...                   =00000003    88    (3)     72     (3)     85     (3)     87     (3)     88     (3)
B_FLAGS                   00000019-R   106   (3)   #-274    (5)   #-331    (5)   #-427    (7)     438    (7)
                                                    441    (7)   #-484    (8)     497    (8)     500    (8)
                                                  #-542    (9)     559    (9)     562    (9)   #-604    (10)
                                                    615    (10)    618    (10)  #-692    (12)    703    (12)
                                                    706    (12)  #-750    (13)    763    (13)    766    (13)
                                                  #-809    (14)    826    (14)    829    (14)  #-872    (15)
                                                    884    (15)    887    (15)
B_FLAGS2                  0000001A-R   107   (3)   #-251    (5)   #-253    (5)   #-292    (5)   #-294    (5)
                                                    313    (5)     314    (5)     317    (5)     322    (5)
                                                    323    (5)     326    (5)   #-428    (7)   #-485    (8)
                                                  #-543    (9)   #-605    (10)  #-693    (12)  #-751    (13)
                                                  #-810    (14)  #-873    (15)
B_RESPONCE                00000018-R   105   (3)     652    (11)
CALC_CHECKSUM             00000B20-R   338   (5)     389    (6)     654    (11)
CEP_FUNCTIONAL           =00000000    72    (3)
CEP_REPAIR               =00000001    72    (3)     72     (3)
CLEAR_BUFFER              00000B3B-R   349   (5)     426    (7)     483    (8)     541    (9)     603    (10)
                                                    691    (12)    749    (13)    808    (14)    871    (15)
DATA_002                  00000020-R   383   (6)     383    (6)
DATA_003                  0000001C-R   649   (11)    649    (11)
DEFAULT                  =00000000    91    (3)
DS$ABORT                  00010020                   316    (5)     319    (5)     321    (5)     325    (5)
                                                    328    (5)     330    (5)     386    (6)     443    (7)
                                                    502    (8)     564    (9)     620    (10)    708    (12)
                                                    768    (13)    831    (14)    889    (15)
DS$ASKLGCL                00010098                   652    (11)
DS$BGNSUB                 00010030                   424    (7)     482    (8)     540    (9)     602    (10)
                                                    689    (12)    748    (13)    807    (14)    870    (15)
DS$BREAK                  00010058                   437    (7)     496    (8)     558    (9)     614    (10)
                                                    624    (10)    702    (12)    762    (13)    825    (14)
                                                    883    (15)    899    (15)
DS$CLRVEC                 00010168                   623    (10)    894    (15)
DS$ENDSUB                 00010038                   445    (7)     504    (8)     566    (9)     622    (10)
                                                    711    (12)    770    (13)    833    (14)    892    (15)
DS$ERRHARD                000100D0                   315    (5)     318    (5)     320    (5)     324    (5)
                                                    327    (5)     329    (5)     442    (7)     501    (8)
                                                    563    (9)     619    (10)    707    (12)    767    (13)
                                                    830    (14)    888    (15)
DS$K_ERROR               =00000002    85    (3)
DS$K_NORMAL              =00000001    85    (3)
DS$K_SEVERE              =00000004    85    (3)
DS$K_SUBSYS              =00000066    85    (3)     85     (3)
DS$K_WARNING             =00000000    85    (3)
DS$PRINTF                 000100F0                   385    (6)     390    (6)     434    (7)     493    (8)
                                                    555    (9)     612    (10)    655    (11)    699    (12)
```

```
                                                  759    (13)     822    (14)     880    (15)     881    (15)
DS$SETVEC                  00010160                387    (6)      651    (11)
DS$_ARITH                 =006600D0     85    (3)
DS$_ASBE                  =00660118     85    (3)
DS$_BADLINK               =006600F0     85    (3)
DS$_BADTYPE               =006600E8     85    (3)
DS$_BIIC                  =00660120     85    (3)
DS$_CHME                  =006600A8     85    (3)
DS$_CHMK                  =006600E0     85    (3)
DS$_DEVNAME               =00660108     85    (3)
DS$_ERROR                 =00660002     85    (3)
DS$_F' E                  =00660068     85    (3)
DS$_FRAGBUF               =00660080     85    (3)
DS$_ICBUSY                =006600C8     85    (3)
DS$_ICERR                 =006600C0     85    (3)
DS$_IHWE                  =00660060     85    (3)
DS$_ILLCHAR               =00660018     85    (3)
DS$_ILLPAGCNT             =00660078     85    (3)
DS$_ILLUNIT               =00660100     85    (3)
DS$_INSFMEM               =00660050     85    (3)
DS$_IPL2HI                =006600B8     85    (3)
DS$_IVADDR                =00660040     85    (3)
DS$_IVVECT                =00660038     85    (3)
DS$_KRNLSTK               =00660090     85    (3)
DS$_LOGIC                 =00660070     85    (3)
DS$_MCHK                  =00660088     85    (3)
DS$_MMOFF                 =00660058     85    (3)
DS$_NEEDUNIT              =006600F8     85    (3)
DS$_NODE                  =00660128     85    (3)
DS$_NOPCS                 =00660110     85    (3)
DS$_NORMAL                =00660001     85    (3)
DS$_NOSUPPORT             =006600B1     85    (3)
DS$_NOTDON                =00660030     85    (3)
DS$_NOTIMP                =006600B0     85    (3)      85     (3)
DS$_NULLSTR               =00660010     85    (3)
DS$_OVERFLOW              =00660008     85    (3)
DS$_POWER                 =00660098     85    (3)
DS$_PROGERR               =00660020     85    (3)
DS$_SEVERE                =00660004     85    (3)
DS$_TRANSL                =006600A0     85    (3)
DS$_TRUNCATE              =00660028     85    (3)
DS$_UNEXPINT              =006600D8     85    (3)
DS$_VASFULL               =00660048     85    (3)
DS$_WARNING               =00660000     85    (3)      85     (3)
DSA$GL_FLAGS               0000FE00                   384    (6)
DSA$V_OPER                =0000000C                 #-384    (6)
ENV$M_DOMAIN              =00000002     72    (3)
ENV$M_LEVEL               =00000001     72    (3)
ENV$M_SUPER               =000003FC     72    (3)
ENV$S_DOMAIN              =00000001     72    (3)
ENV$S_LEVEL               =00000001     72    (3)
ENV$S_SUPER               =00000008     72    (3)
ENV$V_DOMAIN              =00000001     72    (3)      72     (3)
ENV$V_LEVEL               =00000000     72    (3)      72     (3)
ENV$V_SUPER               =00000002     72    (3)
```

```
ENV$_CPU                        =00000000     72      (3)       72      (3)
ENV$_FUNCTIONAL                 =00000000     72      (3)       72      (3)
ENV$_REPAIR                     =00000001     72      (3)       72      (3)
ENV$_SUPER                      =00000001     72      (3)
ENV$_SYSTEM                     =00000001     72      (3)       72      (3)
HALT                            =00000004     91      (3)
IPR                             =00000006     91      (3)
JUMP                             0000001B-R   127     (3)     #-492     (8)     #-611     (10)    #-758     (13)    #-879     (15)
L_BUF_BEGIN                      00000000-R   98      (3)     #-273     (5)     #-286     (5)
L_CHECKSUM                       00000008-R   100     (3)     #-344     (5)     #-432     (7)     #-489     (8)     #-547     (9)
                                                             #-553     (9)     #-609     (10)    #-697     (12)    #-755     (13)
                                                             #-814     (14)    #-820     (14)    #-877     (15)
L_COUNT                          00000004-R   99      (3)     #-340     (5)     #-343     (5)     #-351     (5)     #-353     (5)
L_IS_SP                          00000010-R   102     (3)     #-254     (5)     #-257     (5)     #-295     (5)     #-298     (5)
L_KS_SP                          00000014-R   103     (3)     #-255     (5)     #-258     (5)     #-296     (5)     #-299     (5)
L_PSL                            0000000C-R   101     (3)     #-247     (5)       249     (5)       252     (5)     #-288     (5)
                                                               290     (5)       293     (5)
MANUAL                          =00000001     91      (3)       383     (6)       649     (11)
MCHK                            =00000005     91      (3)
MSG_002                          00000002-R   359     (6)       383     (6)
MSG_003                          00000002-R   628     (11)      649     (11)
M_BADMODE_DN                    =00000001     118     (3)     #-251     (5)
M_BADMODE_UP                    =00000002     120     (3)     #-292     (5)
M_BADSTACK_DN                   =00000004     122     (3)     #-253     (5)
M_BADSTACK_UP                   =00000008     124     (3)     #-294     (5)
M_BAD_PC                        =00000004     115     (3)
M_PWRDN_DONE                    =00000001     111     (3)     #-274     (5)
M_PWRUP_DONE                    =00000002     113     (3)     #-331     (5)
PAR$M_ATDEF                     =00000010     88      (3)
PAR$M_ATHI                      =00000008     88      (3)
PAR$M_ATLO                      =00000004     88      (3)
PAR$M_NODEF                     =00000002     88      (3)
PAR$V_ATDEF                     =00000004     88      (3)
PAR$V_ATHI                      =00000003     88      (3)
PAR$V_ATLO                      =00000002     88      (3)
PAR$V_NODEF                     =00000001     88      (3)
PAR$_BIN                        =00000002     88      (3)
PAR$_DEC                        =0000000A     88      (3)
PAR$_HEX                        =00000010     88      (3)
PAR$_NO                         =00000000     88      (3)     #-652     (11)
PAR$_OCT                        =00000008     88      (3)
PAR$_YES                        =00000001     88      (3)
PCS                             =00000008     91      (3)
POWER_DOWN                       00000924-R   245     (5)       387     (6)       651     (11)
POWER_DOWN_1                     000000A6-R   436     (7)     #-439     (7)
POWER_DOWN_2                     00000132-R   495     (8)     #-498     (8)
POWER_DOWN_3                     000001D1-R   557     (9)     #-560     (9)
POWER_DOWN_4                     0000025B-R   613     (10)    #-616     (10)
POWER_DOWN_5                     000000AD-R   701     (12)    #-704     (12)
POWER_DOWN_6                     00000139-R   761     (13)    #-764     (13)
POWER_DOWN_7                     000001D8-R   824     (14)    #-827     (14)
POWER_DOWN_8                     0000026F-R   882     (15)    #-885     (15)
POWER_FAIL                      =00000003     91      (3)       383     (6)       649     (11)
POWER_UP                         000009CC-R   285     (5)       127     (3)       341     (5)       431     (7)       488     (8)
                                                               546     (9)       552     (9)       608     (10)      696     (12)
```

```
                                                    754    (13)     813    (14)     819    (14)     876    (15)
PR$_ASTLVL                      00000000-XR                     #-271    (5)    #-300    (5)
PR$_ESP                         00000000-XR                     #-261    (5)    #-310    (5)
PR$_ISP                         00000000-XR                     #-254    (5)    #-295    (5)
PR$_KSP                         00000000-XR                     #-258    (5)    #-299    (5)
PR$_P0BR                        00000000-XR                     #-267    (5)    #-304    (5)
PR$_P0LR                        00000000-XR                     #-268    (5)    #-303    (5)
PR$_P1BR                        00000000-XR                     #-269    (5)    #-302    (5)
PR$_P1LR                        00000000-XR                     #-270    (5)    #-301    (5)
PR$_PCBB                        00000000-XR                     #-266    (5)    #-305    (5)
PR$_SBR                         00000000-XR                     #-264    (5)    #-307    (5)
PR$_SCBB                        00000000-XR                     #-272    (5)    #-287    (5)
PR$_SLR                         00000000-XR                     #-265    (5)    #-306    (5)
PR$_SSP                         00000000-XR                     #-262    (5)    #-309    (5)
PR$_USP                         00000000-XR                     #-263    (5)    #-308    (5)
PSL$K_EXEC                      =00000001       87      (3)
PSL$K_KERNEL                    =00000000       87      (3)     #-249    (5)    #-290    (5)
PSL$K_SUPER                     =00000002       87      (3)
PSL$K_USER                      =00000003       87      (3)
PSL$M_CBIT                      =00000001       87      (3)
PSL$M_NBIT                      =00000008       87      (3)
PSL$M_VBIT                      =00000002       87      (3)
PSL$M_ZBIT                      =00000004       87      (3)
PSL$S_CURMOD                    =00000002                       #-248    (5)    #-289    (5)
PSL$V_CBIT                      =00000000       87      (3)
PSL$V_CURMOD                    =00000018                       #-248    (5)    #-289    (5)
PSL$V_IS                        =0000001A                       #-252    (5)    #-293    (5)
PSL$V_NBIT                      =00000003       87      (3)
PSL$V_VBIT                      =00000001       87      (3)
PSL$V_ZBIT                      =00000002       87      (3)
SCB$L_POWER                      0000000C                       #-387    (6)    #-623    (10)   #-651    (11)   #-894    (15)
SEP_FUNCTIONAL                  =00000002       72      (3)
SEP_REPAIR                      =00000003       72      (3)
SIZ...                          =00000001       88      (3)      72    (3)      87    (3)      88    (3)
STRTUP                          =00000100       129     (3)     #-492    (8)    #-611    (10)   #-758    (13)   #-879    (15)
T2_S1                            00000066-R     424     (7)
T2_S1_X                          000000D9-R     445     (7)
T2_S2                            000000E4-R     482     (8)
T2_S2_X                          00000165-R     504     (8)
T2_S3                            00000170-R     540     (9)
T2_S3_X                          00000204-R     566     (9)
T2_S4                            0000020F-R     602     (10)
T2_S4_X                          0000028E-R     622     (10)
T3_S1                            0000006D-R     689     (12)
T3_S1_X                          000000E0-R     711     (12)
T3_S2                            000000EB-R     748     (13)
T3_S2_X                          0000016C-R     770     (13)
T3_S3                            00000177-R     807     (14)
T3_S3_X                          0000020B-R     833     (14)
T3_S4                            00000216-R     870     (15)
T3_S4_X                          000002A2-R     892     (15)
TEST_002                         00000024-R     383     (6)      383    (6)
TEST_002_X                       000002A5-R     624     (10)
TEST_003                         00000020-R     649     (11)     649    (11)
TEST_003_X                       000002B9-R     898     (15)    #-653    (11)
```

```
TU58                            =00000002     91      (3)
T_BADMODE                        0000081B-R   210     (4)       318     (5)
T_BADMODE_DN                     00000843-R   214     (4)       320     (5)
T_BADMODE_UP                     0000086D-R   218     (4)       315     (5)
T_BADSTACK                       00000895-R   222     (4)       327     (5)
T_BADSTACK_DN                    000008C4-R   226     (4)       329     (5)
T_BADSTACK_UP                    000008F5-R   230     (4)       324     (5)
T_BAT_BKUP                       00000692-R   184     (4)       652     (11)
T_INST                           00000021-R   133     (4)       390     (6)       655     (11)
T_MESSAGE_1                      00000063-R   137     (4)       434     (7)
T_MESSAGE_2                      000000F9-R   142     (4)       493     (8)
T_MESSAGE_3                      000001D9-R   148     (4)       555     (9)
T_MESSAGE_4                      0000026D-R   153     (4)       612     (10)
T_MESSAGE_5                      00000352-R   159     (4)       699     (12)
T_MESSAGE_6                      000003EC-R   164     (4)       759     (13)
T_MESSAGE_7                      000004D0-R   170     (4)       822     (14)
T_MESSAGE_8                      00000568-R   175     (4)       880     (15)
T_NO_OPER                        0000073A-R   196     (4)       385     (6)
T_PWRDN_ERROR                    000007D3-R   202     (4)       442     (7)       501     (8)       563     (9)       619     (10)
                                                                 707     (12)      767     (13)      830     (14)      888     (15)
T_PWRUP_ERROR                    000007F8-R   206     (4)
T_PWRUP_FAILURE                  00000704-R   191     (4)
T_SWITCH                         00000651-R   181     (4)       881     (15)
V_BADMODE_DN                    =00000000     117     (3)     #-313     (5)
V_BADMODE_UP                    =00000001     119     (3)     #-314     (5)     #-317     (5)
V_BADSTACK_DN                   =00000002     121     (3)     #-322     (5)
V_BADSTACK_UP                   =00000003     123     (3)     #-323     (5)     #-326     (5)
V_BAD_PC                        =00000002     114     (3)
V_PWRDN_DONE                    =00000000     110     (3)     #-441     (7)     #-500     (8)     #-562     (9)     #-618     (10)
                                                              #-706     (12)    #-766     (13)    #-829     (14)    #-887     (15)
V_PWRUP_DONE                    =00000001     112     (3)     #-438     (7)     #-497     (8)     #-559     (9)     #-615     (10)
                                                              #-703     (12)    #-763     (13)    #-826     (14)    #-884     (15)
WCS                             =00000007     91      (3)
```

Macros Cross Reference

MACRO	SIZE	DEFINITION	REFERENCES...
$D1_ABPROGRAM	1	316 (5)	316 (5) 319 (5) 321 (5) 325 (5) 328 (5) 330 (5) 386 (6) 443 (7) 502 (8) 564 (9) 620 (10) 708 (12) 768 (13) 831 (14) 889 (15)
$D1_BSUBT	1	424 (7)	424 (7) 482 (8) 540 (9) 602 (10) 689 (12) 748 (13) 807 (14) 870 (15)
$D1_BTEST	1	383 (6)	383 (6) 649 (11)
$D1_ERR	1	315 (5)	315 (5) 318 (5) 320 (5) 324 (5) 327 (5) 329 (5) 442 (7) 501 (8) 563 (9) 619 (10) 707 (12) 767 (13) 830 (14) 888 (15)
$D1_ERR_S	1	315 (5)	315 (5) 318 (5) 320 (5) 324 (5) 327 (5) 329 (5) 442 (7) 501 (8) 563 (9) 619 (10) 707 (12) 767 (13) 830 (14) 888 (15)
$D1_ESUBT	1	445 (7)	445 (7) 504 (8) 566 (9) 622 (10) 711 (12) 770 (13) 833 (14) 892 (15)
$D1_ETEST	1	624 (10)	624 (10)
$D1_EXTEST	1	653 (11)	653 (11)
$D1_PRINT_S	1	385 (6)	385 (6) 390 (6) 434 (7) 493 (8) 555 (9) 612 (10) 655 (11) 699 (12) 759 (13) 822 (14) 880 (15) 881 (15)
$D1_SBTTL	2	359 (6)	359 (6) 393 (7) 449 (8) 508 (9) 570 (10) 628 (11) 658 (12) 715 (13) 775 (14) 838 (15)
$D2_BDATA	1	383 (6)	383 (6) 649 (11)
$D2_BTEST	1	383 (6)	383 (6) 649 (11)
$D2_SBTTL	1	359 (6)	359 (6) 628 (11)
$DEF	1	88 (3)	
$DEFINI	1	84 (3)	84 (3) 86 (3) 87 (3) 89 (3)
$DS_ABORT	1	316 (5)	316 (5) 319 (5) 321 (5) 325 (5) 328 (5) 330 (5) 386 (6) 443 (7) 502 (8) 564 (9) 620 (10) 708 (12) 768 (13) 831 (14) 889 (15)
$DS_ASKLGCL_S	1	652 (11)	652 (11)
$DS_BGNMOD	1	72 (3)	72 (3)
$DS_BGNSUB	1	424 (7)	424 (7) 482 (8) 540 (9) 602 (10) 689 (12) 748 (13) 807 (14) 870 (15)
$DS_BGNTEST	1	383 (6)	383 (6) 649 (11)
$DS_BOPER	1	384 (6)	384 (6)
$DS_BREAK	1	437 (7)	437 (7) 496 (8) 558 (9) 614 (10) 624 (10) 702 (12) 762 (13) 825 (14) 883 (15)
$DS_CLRVEC_S	1	623 (10)	623 (10) 894 (15)
$DS_DSADEF	5	89 (3)	89 (3)
$DS_DSDEF	2	85 (3)	85 (3)
$DS_DSSDEF	8	86 (3)	86 (3)
$DS_ENDDATA	1	383 (6)	383 (6) 649 (11)
$DS_ENDMOD	1	905 (15)	905 (15)
$DS_ENDSUB	1	445 (7)	445 (7) 504 (8) 566 (9) 622 (10) 711 (12) 770 (13) 833 (14) 892 (15)
$DS_ENDTEST	1	624 (10)	624 (10)
$DS_ENVDEF	2	72 (3)	72 (3)
$DS_ERRHARD_S	1	315 (5)	315 (5) 318 (5) 320 (5) 324 (5) 327 (5)

```
                                  329  (5)      442  (7)      501  (8)      563  (9)      619  (10)
                                  707  (12)     767  (13)     830  (14)     888  (15)
$DS_EXIT            1     653  (11)  653  (11)
$DS_PAGE            1     357  (5)   357  (5)      391  (6)      447  (7)      506  (8)      568  (9)
                                  626  (10)     656  (11)     713  (12)     772  (13)     835  (14)
$DS_PARDEF          1     88   (3)   88   (3)
$DS_PRINTF_S        1     385  (6)   385  (6)      390  (6)      434  (7)      493  (8)      555  (9)
                                  612  (10)     655  (11)     699  (12)     759  (13)     822  (14)
                                  880  (15)     881  (15)
$DS_PSLDEF          1     87   (3)   87   (3)
$DS_SBTTL           1     359  (6)   359  (6)      393  (7)      449  (8)      508  (9)      570  (10)
                                  628  (11)     658  (12)     715  (13)     775  (14)     838  (15)
$DS_SCBDEF          3     84   (3)   84   (3)
$DS_SECDEF          1     91   (3)   91   (3)
$DS_SETVEC_S        1     387  (6)   387  (6)      651  (11)
$EQU                1     88   (3)   72   (3)      85   (3)      87   (3)      88   (3)
$EQULS1             1     87   (3)   72   (3)      85   (3)      87   (3)
$EQULST             1     72   (3)   72   (3)      85   (3)      87   (3)
$GBLINI             2     72   (3)   72   (3)      85   (3)      87   (3)      88   (3)
$PSLDEF             2     87   (3)   87   (3)
$PUSHADR            1     315  (5)   315  (5)      318  (5)      320  (5)      324  (5)      327  (5)
                                  329  (5)      442  (7)      501  (8)      563  (9)      619  (10)
                                  652  (11)     707  (12)     767  (13)     830  (14)     888  (15)
$VIELD              1     72   (3)   72   (3)      87   (3)      88   (3)
$VIELD1             1     88   (3)   72   (3)      87   (3)      88   (3)
ECKAX_SECDEF        1     91   (3)   91   (3)
```

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	116	00:00:00.34	00:00:03.32
Command processing	909	00:00:00.97	00:00:02.34
Pass 1	929	00:00:17.05	00:00:35.56
Symbol table sort	0	00:00:00.64	00:00:00.90
Pass 2	18	00:00:04.45	00:00:08.13
Symbol table output	11	00:00:00.30	00:00:00.97
Psect synopsis output	2	00:00:00.03	00:00:00.03
Cross-reference output	6	00:00:01.51	00:00:02.14
Assembler run totals	1993	00:00:25.29	00:00:53.41

The working set limit was 3062 pages.
216678 bytes (424 pages) of virtual memory were used to buffer the intermediate code.
There were 30 pages of symbol table space allocated to hold 458 non-local and 35 local symbols.
907 source lines were read in Pass 1, producing 34 object records in Pass 2.
105 pages of virtual memory were used to define 45 macros.

```
                                    +----------------------------+
                                    ! Macro library statistics !
                                    +----------------------------+

Macro library name                   Macros defined
------------------                   --------------
DISK$DIAGPACK02:[TAYLOR.ECKAX]ECKAX.MLB;1          1
SYS$COMMON:[SYSLIB]DIAG.MLB;955                   39
SYS$COMMON:[SYSLIB]STARLET.MLB;1                   7
TOTALS (all libraries)                            47

789 GETS were required to define 47 macros.

There were no errors, warnings or information messages.

MACRO/LIS=ECKAX3.LIS/CROSS ECKAX3
```

Table of contents

(1) 1 ECKAX4: PROCESSOR HALT
(2) 69 DECLARATIONS .LIST MEB
(3) 185 INSTRUCION MESSAGES
(4) 225 ERROR MESSAGES
(5) 346 DATA TABLES
(6) 430 SUBROUTINES
(7) 598 TEST 4: PROCESSOR HALTS ARCHITECTURALLY DEFINED
(8) 623 SUBTEST 4.1: HALT instruction in Kernel Mode
(9) 707 SUBTEST 4.2: Interrupt Stack invalid
(10) 870 SUBTEST 4.3: IS SP points to NXM
(11) 991 SUBTEST 4.4: CHMU instruction with PSL<IS>=1
(12) 1107 SUBTEST 4.5: CHMS instruction with PSL<IS>=1
(13) 1226 SUBTEST 4.6: CHME instruction with PSL<IS>=1
(14) 1344 SUBTEST 4.7: CHMK instruction with PSL<IS>=1
(15) 1467 TEST 5: PROCESSOR HALTS ARCH. UNDEFINED
(16) 1501 SUBTEST 5.1: CHMU inst. with vector service on IS
(17) 1587 SUBTEST 5.2: CHMS inst. with vector service on IS
(18) 1673 SUBTEST 5.3: CHME inst. with vector service on IS
(19) 1759 SUBTEST 5.4: CHMK inst. with vector service on IS
(20) 1850 SUBTEST 5.5: Invalid vector HALT

```
0000     1          .SBTTL  ECKAX4: PROCESSOR HALT
0000     2          .TITLE  ECKAX4  VAX-11/750 Specific CPU Cluster Exerciser
0000     3          .IDENT  /5.2/
0000     4
0000     5 ;
0000     6 ; Copyright (C) 1980,1983,1986
0000     7 ; Digital Equipment Corporation, Maynard, Massachusetts 01754
0000     8 ;
0000     9 ; This software is furnished  under a license for use only on a single
0000    10 ; computer  system and  may be  copied only with  the inclusion of the
0000    11 ; above copyright notice.  This software, or any other copies thereof,
0000    12 ; may not be provided or  otherwise made available to any other person
0000    13 ; except for use on such system and to one who agrees to these license
0000    14 ; terms.  Title to and  ownership of the  software  shall at all times
0000    15 ; remain in DEC.
0000    16 ;
0000    17 ; The information in this software is subject to change without notice
0000    18 ; and should  not be construed  as a commitment  by Digital  Equipment
0000    19 ; Corporation.
0000    20 ;
0000    21 ; Dec assumes  no  responsibility  for  the use or  reliability of its
0000    22 ; software on equipment which is not supplied by DEC.
0000    23 ;
0000    24
0000    25 ;++
0000    26 ; Facility:     VAX Architecture Diagnostic.
0000    27 ;
0000    28 ; Abstract:     This module checks the various ways the VAX-11/750 processor
0000    29 ;               can be halted in an ARCHITECTURALLY DEFINED and an ARCHITEC-
0000    30 ;               TURALLY UNDEFINED manner. These ways
0000    31 ;               include executing a HALT instruction in kernel mode, attempting
0000    32 ;               certain references to an invalid interrupt stack, executing
0000    33 ;               a change mode instruction when the IS bit of the PSL is set,
0000    34 ;               a change mode instruction with vertor service on IS and invalid
0000    35 ;               vector Halt.
0000    36 ;
0000    37 ; Environment:  VAX Diagnostic Supervisor.
0000    38 ;
0000    39 ; Author:       Fred Roemer     16-Jun-80       Version 1.0
0000    40 ;
0000    41 ;       NO CHANGES TO THIS MODULE FOR VERSION 3.3 (DOCUMENT CHANGE ONLY)
0000    42 ;
0000    43 ;
0000    44 ;       Dan Milleville  19-Mar-82               Version 3.4
0000    45 ;       Changed Test 3 exit code to accomodate temporarily a hardware problem.
0000    46 ;
0000    47 ;       Dave Shull      30-Nov-82               Version 4.0
0000    48 ;       Added tests 13 and 14 for coverage of PCS module.
0000    49 ;
0000    50 ;       Tai-Chun Pan    04-Mar-83               Version 5.0
0000    51 ;       Added test 5 for coverage of Processor Halts Architecture Undefined.
0000    52 ;       Added tests 11 and 12 for coverage of new ROM with MRSP of TU58.
0000    53 ;
0000    54 ;       Dan Milleville  21-Nov-83               Version 5.1
0000    55 ;       Fixed error in timer routine (didn't turn off timer).
```

```
0000     56 ;
0000     57 ;       Wayne R. Taylor February 1986          Version 5.2
0000     58 ;       Redefined IPR's to jive with starlet.
0000     59 ;       Modified the code for problem report Eckax5 where:
0000     60 ;               Tests 6 & 13 tests with cache off.
0000     61 ;               Subtest 1 does not check bit 0 of the memory under test.
0000     62 ;               Subtest 4 tests row 0, 1, 2, but not row 3.
0000     63 ;       Indicate to user if the operator flag is not set for tests 2 through 5.
0000     64 ;       Modifications were supplied by the submitter.
0000     65 ;       Search on 5.2.
0000     66 ;
0000     67 ;--
```

```
                     0000     69          .SBTTL  DECLARATIONS    .LIST   MEB
                     0000     70          .NLIST  CND
                 00000000     71          .PSECT ECKAXD,  LONG
                     0000     72          .LIBRARY        "SYS$LIBRARY:DIAG"; VAX family diagnostic library.
                     0000     73          $DS_BGNMOD      CEP_REPAIR, TN=4
                     0000        ;;;      Macro-32 Diagnostic macro library Version 8.3 "DIAG.MLB (245)"
                     0000     74
                     0000     75 ;
                     0000     76 ; Include files:
                     0000     77 ;
                     0000     78
                     0000     79          .LIBRARY        "ECKAX"         ; CPU Cluster Exerciser library.
                     0000     80
                     0000     81 ;
                     0000     82 ; Equated symbols:
                     0000     83 ;
                     0000     87
                     0000     88          $DS_SCBDEF
                     0000     89          $DS_DSDEF
                     0000     90          $DS_ERRDEF
                     0000     91          $DS_DSSDEF
                     0000     92          $DS_PSLDEF
                     0000     93          $DS_DSADEF
                     0000     94
                     0000     95          ECKAX_SECDEF
                     0000     96
                     0000     97
                 00000004  0000     98 B_ANSWER:       .BLKL                   ; used to storage answer (for asklgcl)
                 00000004  0000     98 B_ANSWER:       .BLKL                   ; used to storage answer (for asklgcl)
                 00000008  0004     99 RENTRY_POINT:   .BLKL                   ; used to store rentry address
                 0000000C  0008    100 L_PAGESTRT:     .BLKL                   ; first of 2 longword array to store
                 00000010  000C    101 L_PAGEND:       .BLKL                   ; page boundary addresses to setprot
                 00000014  0010    102 L_PAGEZERO:     .BLKL                   ; first of 2 longword array to store
                 00000018  0014    103 L_PAGE0END:     .BLKL                   ; page 0 boundary addresses to setprot
                           0018    104
                 0000001C  0018    105 L_COUNT:        .BLKL                   ; used as a counter
                 00000020  001C    106 L_ADDRESS:      .BLKL                   ; used to temporary store addresses
                 00000024  0020    107 L_CUR_ISP:      .BLKL                   ; used to store initial ISP
                 00000028  0024    108 L_EXP_MOD:      .BLKL                   ; temp storage of expected mode
                 0000002C  0028    109 L_EXP_STACK:    .BLKL                   ; temp storage of expected stack
                 00000030  002C    110 L_OLDPROT:      .BLKL                   ; byte to store old page protection
                 00000034  0030    111 L_TEMP:         .BLKL                   ; temporary storage
                 00000038  0034    112 L_CUR_SCBB:     .BLKL                   ; location to store SCBB
                 0000003C  0038    113 L_KA_FLAGS:     .BLKL
                           003C    114
                 00000040  003C    115 L_FLAGS:        .BLKL                   ; contains the following flags
                           0040    116                                         ; bit positions and masks
                 00000000  0040    117 KA_UNIT_NO=0
                 00000000  0040    118 V_READY=0                               ; ready to execute flag
                 00000001  0040    119 M_READY=1@0                             ;
                 00000001  0040    120 V_DONE=1                                ; restart done flag
                 00000002  0040    121 M_DONE=1@1                              ;
                 00000002  0040    122 V_EXECUTE_ERR=2                         ; execution error flag
                 00000004  0040    123 M_EXECUTE_ERR=1@2                       ;
                 00000003  0040    124 V_CHMX_ERR=3                            ; change mode error
                 00000008  0040    125 M_CHMX_ERR=1@3                          ;
```

```
00000004  0040   126 V_XFC_ERR=4                                  ; XFC error
00000010  0040   127 M_XFC_ERR=1a4                                ;
00000005  0040   128 V_TIMER=5                                   ; timer interrupt flag
00000020  0040   129 M_TIMER=1a5                                 ;
00000006  0040   130 V_BAD_MODE=6                                ; bad mode, abort test
00000040  0040   131 M_BAD_MODE=1a6                              ;
00000007  0040   132 V_BAD_STK=7                                 ; stack bad, abort test
00000080  0040   133 M_BAD_STK=1a7                               ;
00000008  0040   134 V_FATAL_ERR=8                               ; flag fatal error
00000100  0040   135 M_FATAL_ERR=1a8                             ;
00000009  0040   136 V_PSL_ERR=9                                 ; flag PSL error
00000200  0040   137 M_PSL_ERR=1a9                               ;
0000000A  0040   138 V_GPR_ERR=10                                ; flag GPR error
00000400  0040   139 M_GPR_ERR=1a10                              ;
0000000B  0040   140 V_XFC=11                                    ; expected XFC
00000800  0040   141 M_XFC=1a11                                  ;
0000000C  0040   142 V_ERROR_FLAG=12                             ; flag any error
00001000  0040   143 M_ERROR_FLAG=1a12                           ;
0000000D  0040   144 V_KSP_ERR=13                                ; flag KSP error
00002000  0040   145 M_KSP_ERR=1a13                              ;
0000000E  0040   146 V_ISP_ERR=14                                ; flag ISP error
00004000  0040   147 M_ISP_ERR=1a14                              ;
0000000F  0040   148 V_SP_ERR=15                                 ; flag SP error
00008000  0040   149 M_SP_ERR=1a15                               ;
00000010  0040   150 V_ISTK=16                                   ; flag interrupt stack
00010000  0040   151 M_ISTK=1a16                                 ;
00500200  0040   152 L_NXM_ADR=^X500200                          ; address of nonexist memory
00E00000  0040   153 L_BNXM_ADR=^XE00000                         ; big address
00000019  0040   154 V_USR_WCS=25
          0040   155
00000000  0040   156 CODE_00=^X0                                 ; halt code equates
00000002  0040   157 CODE_02=^X2
00000004  0040   158 CODE_04=^X4
00000005  0040   159 CODE_05=^X5
00000006  0040   160 CODE_06=^X6
00000007  0040   161 CODE_07=^X7
00000008  0040   162 CODE_08=^X8
0000000A  0040   163 CODE_0A=^XA
0000000B  0040   164 CODE_0B=^XB
0000000C  0040   165 CODE_0C=^XC
0000000F  0040   166 CODE_0F=^XF
00000011  0040   167 CODE_11=^X11
00000012  0040   168 CODE_12=^X12
00000013  0040   169 CODE_13=^X13
00000014  0040   170 CODE_14=^X14
00000015  0040   171 CODE_15=^X15
00000016  0040   172 CODE_16=^X16
000000FF  0040   173 CODE_FF=^XFF
          0040   174
00000080  0040   175 BUFSIZ=128
          0040   176
00000100  0040   177 RESTART=^X100                              ; label for memory loc 100
0000003C'9F   02   C8  0040   178 JUMP:   BISL2   #M_DONE,@#L_FLAGS   ; code to set done and go to routine
     00000C6A'9F   17  0047   179         JMP     @#READ_GPR          ; to read all GPR's after a halt
                   004D   180
```

```
                                        004D    185 .SBTTL INSTRUCION MESSAGES
                                        004D    186
                                        004D    187 ;-----------------------------------------------------------------------
                                        004D    188 ; 5.2
                                        004D    189
                                        004D    190 T_NO_OPER:
6C 61 75 6E 61 4D 20 2F 21 2F 21 00'    004D    191         .ASCIC  "!/!/ Manual Section:  Tests 2 through 5 require operator interven -
cont> tion.!/"-
54 20 20 3A 6E 6F 69 74 63 65 53 20     0059
75 6F 72 68 74 20 32 20 73 74 73 65     0065
65 72 69 75 71 65 72 20 35 20 68 67     0071
6E 69 20 72 6F 74 61 72 65 70 6F 20     007D
21 2E 6E 6F 69 74 6E 65 76 72 65 74     0089
65 70 6F 20 65 68 74 20 74 65 53 2F     0095
74 20 67 61 6C 66 20 72 6F 74 61 72     00A1
65 74 20 65 74 75 63 65 78 65 20 6F     00AD
67 75 6F 72 68 74 20 32 20 73 74 73     00B9
                2F 21 20 2E 35 20 68    00C5
                                        00CC    192                 "Set the operator flag to execute tests 2 through 5. !/"-
20 74 72 61 74 73 65 72 20 64 6E 61     00CC    193                 "and restart the sections. "
73 6E 6F 69 74 63 65 73 20 65 68 74     00D8
                        20 2E           00E4
                           98           004D
                                        00E6    194 ;-----------------------------------------------------------------------
                                        00E6    195 T_DBL_MCHK_ERR:
63 6E 65 72 65 66 65 72 20 61 20 00'    00E6    196         .ASCIC  " a reference to NXM with vector pointing to NXM location.!/!/"
74 69 77 20 4D 58 4E 20 6F 74 20 65     00F2
69 6F 70 20 72 6F 74 63 65 76 20 68     00FE
4D 58 4E 20 6F 74 20 67 6E 69 74 6E     010A
2F 21 2E 6E 6F 69 74 61 63 6F 6C 20     0116
                        2F 21           0122
                           3D           00E6
                                        0124    197 ;-----------------------------------------------------------------------
                                        0124    198 T_NXM_WCS_ERR:
72 65 66 73 6E 61 72 74 20 61 20 00'    0124    199         .ASCIC  " a transfer to user WCS which has not been loaded.!/!/"
53 43 57 20 72 65 73 75 20 6F 74 20     0130
6E 20 73 61 68 20 68 63 69 68 77 20     013C
64 61 6F 6C 20 6E 65 65 62 20 74 6F     0148
                2F 21 2F 21 2E 64 65    0154
                                  36    0124
                                        015B    200 ;-----------------------------------------------------------------------
                                        015B    201 T_SCBBNXM_ERR:
73 6E 69 20 43 46 58 20 6E 61 20 00'    015B    202         .ASCIC  " an XFC inst with SCBB pointing to non-existent memory.!/!/"
20 42 42 43 53 20 68 74 69 77 20 74     0167
20 6F 74 20 67 6E 69 74 6E 69 6F 70     0173
74 6E 65 74 73 69 78 65 2D 6E 6F 6E     017F
2F 21 2F 21 2E 79 72 6F 6D 65 6D 20     018B
                              3B        015B
                                        0197    203 ;-----------------------------------------------------------------------
                                        0197    204 T_REST_OFF:
4F 54 55 41 20 65 68 74 20 73 49 00'    0197    205         .ASCIC  "Is the AUTO RESTART switch in the off position?"
69 77 73 20 54 52 41 54 53 45 52 20     01A3
6F 20 65 68 74 20 6E 69 20 68 63 74     01AF
3F 6E 6F 69 74 69 73 6F 70 20 66 66     01BB
                              2F        0197
                                        01C7    206 ;-----------------------------------------------------------------------
```

```
                                        01C7    207 T_EXITING:
4C 41 48 20 67 6E 69 74 69 78 45 00'    01C7    208         .ASCIC  "Exiting HALT test.!/"
          2F 21 2E 74 73 65 74 20 54    01D3
                                  14    01C7
                                        01DC    209
                                        01DC    210 ;-----------------------------------------------------------------------
                                        01DC    211 T_INSTRUCTIONS:
65 70 78 65 20 54 4C 41 48 2F 21 00'    01DC    212         .ASCIC  "!/HALT expected with following printout:!/"-
6F 66 20 68 74 69 77 20 64 65 74 63     01E8
6E 69 72 70 20 67 6E 69 77 6F 6C 6C     01F4
                  2F 21 3A 74 75 6F 74  0200
   2F 21 20 42 58 21 20 20 4C 58 21     0207    213                 "!XL  !XB !/"
                                  35    01DC
                                        0212    214
                                        0212    215 ;-----------------------------------------------------------------------
                                        0212    216 T_CONTINUE:
65 75 6E 69 74 6E 6F 63 20 6F 54 00'    0212    217         .ASCIC  "To continue from console mode do the following:!/"-
6C 6F 73 6E 6F 63 20 6D 6F 72 66 20     021E
68 74 20 6F 64 20 65 64 6F 6D 20 65     022A
3A 67 6E 69 77 6F 6C 6C 6F 66 20 65     0236
                              2F 21     0242
43 3C 20 30 30 31 20 46 20 47 2F 44     0244    218                 "D/G F 100 <CR> and then C <CR>"
20 6E 65 68 74 20 64 6E 61 20 3E 52     0250
                  3E 52 43 3C 20 43     025C
                                  4F    0212
                                        0262    219 ;-----------------------------------------------------------------------
                                        0262    220 T_WARNING:
20 3A 47 4E 49 4E 52 41 57 2F 21 00'    0262    221         .ASCIC  "!/WARNING: The front panel switch must be in the HALT!/"-
61 70 20 74 6E 6F 72 66 20 65 68 54     026E
6D 20 68 63 74 69 77 73 20 6C 65 6E     027A
68 74 20 6E 69 20 65 62 20 74 73 75     0286
                  2F 21 54 4C 41 48 20  0292
20 73 69 68 74 20 72 6F 66 20 20 09     029A    222                 "       for this test to operate properly.!/"
72 65 70 6F 20 6F 74 20 74 73 65 74     02A6
79 6C 72 65 70 6F 72 70 20 65 74 61     02B2
                              2F 21 2E  02BE
                                  5E    0262
                                        02C1    223 ;-----------------------------------------------------------------------
```

```
                                        02C1    225 .SBTTL  ERROR MESSAGES
                                        02C1    226 ;-----------------------------------------------------------------------
                                        02C1    227 T_HALT_MESS:
20 64 65 74 70 6D 65 74 74 41 20 00'    02C1    228         .ASCIC  " Attempted to halt the processor by executing!/"
20 65 68 74 20 74 6C 61 68 20 6F 74     02CD
79 62 20 72 6F 73 73 65 63 6F 72 70     02D9
2F 21 67 6E 69 74 75 63 65 78 65 20     02E5
                                  2F    02C1
                                        02F1    229 ;-----------------------------------------------------------------------
                                        02F1    230 T_HALT_ERR:
6F 63 20 6F 72 63 61 6D 20 61 20 00'    02F1    231         .ASCIC  " a macro code HALT instruction.!/!/"
74 73 6E 69 20 54 4C 41 48 20 65 64     02FD
2F 21 2F 21 2E 6E 6F 69 74 63 75 72     0309
                                  23    02F1
                                        0315    232 ;-----------------------------------------------------------------------
                                        0315    233 T_INVLDIS_ERR:
73 6E 69 20 43 46 58 20 6E 61 20 00'    0315    234         .ASCIC  " an XFC inst with the IS pointing to a protected page.!/!/"
49 20 65 68 74 20 68 74 69 77 20 74     0321
74 20 67 6E 69 74 6E 69 6F 70 20 53     032D
65 74 63 65 74 6F 72 70 20 61 20 6F     0339
   2F 21 2F 21 2E 65 67 61 70 20 64     0345
                                  3A    0315
                                        0350    235 ;-----------------------------------------------------------------------
                                        0350    236 T_NXMIS_ERR:
73 6E 69 20 43 46 58 20 6E 61 20 00'    0350    237         .ASCIC  " an XFC inst with the IS pointing to nonexistent memory.!/!/"
49 20 65 68 74 20 68 74 69 77 20 74     035C
74 20 67 6E 69 74 6E 69 6F 70 20 53     0368
6E 65 74 73 69 78 65 6E 6F 6E 20 6F     0374
21 2F 21 2E 79 72 6F 6D 65 6D 20 74     0380
                                  2F    038C
                                  3C    0350
                                        038D    238 ;-----------------------------------------------------------------------
                                        038D    239 T_CHMU_ERR:
73 6E 69 20 55 4D 48 43 20 61 20 00'    038D    240         .ASCIC  " a CHMU instruction with PSL<IS>=1.!/!/"
74 69 77 20 6E 6F 69 74 63 75 72 74     0399
2E 31 3D 3E 53 49 3C 4C 53 50 20 68     03A5
                        2F 21 2F 21     03B1
                                  27    038D
                                        03B5    241 ;-----------------------------------------------------------------------
                                        03B5    242 T_CHMS_ERR:
73 6E 69 20 53 4D 48 43 20 61 20 00'    03B5    243         .ASCIC  " a CHMS instruction with PSL<IS>=1.!/!/"
74 69 77 20 6E 6F 69 74 63 75 72 74     03C1
2E 31 3D 3E 53 49 3C 4C 53 50 20 68     03CD
                        2F 21 2F 21     03D9
                                  27    03B5
                                        03DD    244 ;-----------------------------------------------------------------------
                                        03DD    245 T_CHME_ERR:
73 6E 69 20 45 4D 48 43 20 61 20 00'    03DD    246         .ASCIC  " a CHME instruction with PSL<IS>=1.!/!/"
74 69 77 20 6E 6F 69 74 63 75 72 74     03E9
2E 31 3D 3E 53 49 3C 4C 53 50 20 68     03F5
                        2F 21 2F 21     0401
                                  27    03DD
                                        0405    247 ;-----------------------------------------------------------------------
                                        0405    248 T_CHMK_ERR:
73 6E 69 20 4B 4D 48 43 20 61 20 00'    0405    249         .ASCIC  " a CHMK instruction with PSL<IS>=1.!/!/"
```

```
74 69 77 20 6E 6F 69 74 63 75 72 74   0411
2E 31 3D 3E 53 49 3C 4C 53 50 20 68   041D
                  2F 21 2F 21         0429
                        27            0405
                                      042D    250 ;-----------------------------------------------------------------------
                                      042D    251 T_SCB_ERR:.
73 6E 69 20 43 46 58 20 6E 61 20 00'  042D    252         .ASCIC  " an XFC inst with the SCB vector entry <1:0> = 3.!/!/"
53 20 65 68 74 20 68 74 69 77 20 74   0439
6E 65 20 72 6F 74 63 65 76 20 42 43   0445
20 3D 20 3E 30 3A 31 3C 20 79 72 74   0451
                  2F 21 2F 21 2E 33   045D
                              35      042D
                                      0463    253 ;-----------------------------------------------------------------------
                                      0463    254 T_WCS_ERR:
73 6E 69 20 43 46 58 20 6E 61 20 00'  0463    255         .ASCIC  " an XFC inst with SCB vector entry <1:0>=2!/"-
76 20 42 43 53 20 68 74 69 77 20 74   046F
20 79 72 74 6E 65 20 72 6F 74 63 65   047B
         2F 21 32 3D 3E 30 3A 31 3C   0487
73 69 64 20 53 43 57 20 64 6E 61 20   0490    256                 " and WCS disabled or not present!/!/."
74 6F 6E 20 72 6F 20 64 65 6C 62 61   049C
2F 21 2F 21 74 6E 65 73 65 72 70 20   04A8
                              2E      04B4
                              51      0463
                                      04B5    257 ;-----------------------------------------------------------------------
                                      04B5    258 T_CHMUSCB_ERR:
73 6E 69 20 55 4D 48 43 20 61 20 00'  04B5    259         .ASCIC  " a CHMU inst with the SCB vector entry <1:0> not = 0 .!/!/"
53 20 65 68 74 20 68 74 69 77 20 74   04C1
6E 65 20 72 6F 74 63 65 76 20 42 43   04CD
6F 6E 20 3E 30 3A 31 3C 20 79 72 74   04D9
   2F 21 2F 21 2E 20 30 20 3D 20 74   04E5
                              3A      04B5
                                      04F0    260 ;-----------------------------------------------------------------------
                                      04F0    261 T_CHMSSCB_ERR:
73 6E 69 20 53 4D 48 43 20 61 20 00'  04F0    262         .ASCIC  " a CHMS inst with the SCB vector entry <1:0> not = 0 .!/!/"
53 20 65 68 74 20 68 74 69 77 20 74   04FC
6E 65 20 72 6F 74 63 65 76 20 42 43   0508
6F 6E 20 3E 30 3A 31 3C 20 79 72 74   0514
   2F 21 2F 21 2E 20 30 20 3D 20 74   0520
                              3A      04F0
                                      052B    263 ;-----------------------------------------------------------------------
                                      052B    264 T_CHMESCB_ERR:
73 6E 69 20 45 4D 48 43 20 61 20 00'  052B    265         .ASCIC  " a CHME inst with the SCB vector entry <1:0> not = 0 .!/!/"
53 20 65 68 74 20 68 74 69 77 20 74   0537
6E 65 20 72 6F 74 63 65 76 20 42 43   0543
6F 6E 20 3E 30 3A 31 3C 20 79 72 74   054F
   2F 21 2F 21 2E 20 30 20 3D 20 74   055B
                              3A      052B
                                      0566    266 ;-----------------------------------------------------------------------
                                      0566    267 T_CHMKSCB_ERR:
73 6E 69 20 4B 4D 48 43 20 61 20 00'  0566    268         .ASCIC  " a CHMK inst with the SCB vector entry <1:0> not = 0 .!/!/"
53 20 65 68 74 20 68 74 69 77 20 74   0572
6E 65 20 72 6F 74 63 65 76 20 42 43   057E
6F 6E 20 3E 30 3A 31 3C 20 79 72 74   058A
   2F 21 2F 21 2E 20 30 20 3D 20 74   0596
                              3A      0566
```

```
                                        05A1   ;-----------------------------------------------------------------------
                                        05A1   T_NOT_READY:
72 74 73 6E 69 20 74 73 65 54 20 00'    05A1           .ASCIC  " Test instruction was not ready to be executed.!/"
6E 20 73 61 77 20 6E 6F 69 74 63 75     05AD
20 6F 74 20 79 64 61 65 72 20 74 6F     05B9
2E 64 65 74 75 63 65 78 65 20 65 62     05C5
                                2F 21   05D1
                                   31   05A1
                                        05D3   ;-----------------------------------------------------------------------
                                        05D3   T_NOT_DONE:
6C 66 20 74 72 61 74 73 65 52 20 00'    05D3           .ASCIC  " Restart flag was not set while restarting.!/"
73 20 74 6F 6E 20 73 61 77 20 67 61     05DF
73 65 72 20 65 6C 69 68 77 20 74 65     05EB
      2F 21 2E 67 6E 69 74 72 61 74     05F7
                                   2D   05D3
                                        0601   ;-----------------------------------------------------------------------
                                        0601   T_EXECUTE:
72 74 73 6E 69 20 74 73 65 54 20 00'    0601           .ASCIC  " Test instruction execution error.!/"
75 63 65 78 65 20 6E 6F 69 74 63 75     060D
21 2E 72 6F 72 72 65 20 6E 6F 69 74     0619
                                   2F   0625
                                   24   0601
                                        0626   ;-----------------------------------------------------------------------
                                        0626   T_XFC:
75 72 74 73 6E 69 20 43 46 58 20 00'    0626           .ASCIC  " XFC instruction executed instead of causing halt.!/"
74 75 63 65 78 65 20 6E 6F 69 74 63     0632
6F 20 64 61 65 74 73 6E 69 20 64 65     063E
61 68 20 67 6E 69 73 75 61 63 20 66     064A
                     2F 21 2E 74 6C     0656
                                   34   0626
                                        065B   ;-----------------------------------------------------------------------
                                        065B   T_CHMX_ERR:
72 74 73 6E 69 20 78 4D 48 43 20 00'    065B           .ASCIC  " CHMx instruction executed instead of causing halt.!/"
75 63 65 78 65 20 6E 6F 69 74 63 75     0667
20 64 61 65 74 73 6E 69 20 64 65 74     0673
68 20 67 6E 69 73 75 61 63 20 66 6F     067F
                  2F 21 2E 74 6C 61     068B
                                   35   065B
                                        0691   ;-----------------------------------------------------------------------
                                        0691   T_TIMER:
64 65 74 63 65 70 78 65 6E 55 20 00'    0691           .ASCIC  " Unexpected interval timer interrupt.!/"
69 74 20 6C 61 76 72 65 74 6E 69 20     069D
70 75 72 72 65 74 6E 69 20 72 65 6D     06A9
                        2F 21 2E 74     06B5
                                   27   0691
                                        06B9   ;-----------------------------------------------------------------------
                                        06B9   T_KSP_ERR1:
63 6E 69 20 73 69 20 50 53 4B 20 00'    06B9           .ASCIC  " KSP is incorrect  -   EXP = !XL  ACT = !XL!/"
20 20 20 2D 20 20 74 63 65 72 72 6F     06C5
41 20 20 4C 58 21 20 3D 20 50 58 45     06D1
      2F 21 4C 58 21 20 3D 20 54 43     06DD
                                   2D   06B9
                                        06E7   ;-----------------------------------------------------------------------
                                        06E7   T_KSP_ERR2:
20 20 20 2D 20 20 20 50 53 4B 20 00'    06E7           .ASCIC  " KSP   -   EXP =(UNPREDICTABLE)   ACT = !XL!/"
```

```
44 45 52 50 4E 55 28 3D 20 50 58 45   06F3
41 20 20 20 29 45 4C 42 41 54 43 49   06FF
      2F 21 4C 58 21 20 3D 20 54 43   070B
                                 2D   06E7
                                      0715    293 ;-----------------------------------------------------------------------
                                      0715    294 T_ISP_ERR1:
63 6E 69 20 73 69 20 50 53 49 20 00'  0715    295         .ASCIC  " ISP is incorrect  -   EXP = !XL  ACT = !XL!/"
20 20 20 2D 20 20 74 63 65 72 72 6F   0721
41 20 20 4C 58 21 20 3D 20 50 58 45   072D
      2F 21 4C 58 21 20 3D 20 54 43   0739
                                 2D   0715
                                      0743    296 ;-----------------------------------------------------------------------
                                      0743    297 T_ISP_ERR2:
20 20 20 2D 20 20 20 50 53 49 20 00'  0743    298         .ASCIC  " ISP   -   EXP =(UNPREDICTABLE)   ACT = !XL!/"
44 45 52 50 4E 55 28 3D 20 50 58 45   074F
41 20 20 20 29 45 4C 42 41 54 43 49   075B
      2F 21 4C 58 21 20 3D 20 54 43   0767
                                 2D   0743
                                      0771    299 ;-----------------------------------------------------------------------
                                      0771    300 T_SP_ERR1:
6F 63 6E 69 20 73 69 20 50 53 20 00'  0771    301         .ASCIC  " SP is incorrect   -   EXP = !XL  ACT = !XL!/"
20 20 20 2D 20 20 20 74 63 65 72 72   077D
41 20 20 4C 58 21 20 3D 20 50 58 45   0789
      2F 21 4C 58 21 20 3D 20 54 43   0795
                                 2D   0771
                                      079F    302 ;-----------------------------------------------------------------------
                                      079F    303 T_SP_ERR2:
2F 21 4C 58 21 20 3D 20 50 53 20 00'  079F    304         .ASCIC  " SP = !XL!/"
                                 0B   079F
                                      07AB    305 ;-----------------------------------------------------------------------
                                      07AB    306 T_GPR_ERR:
69 20 61 74 61 64 20 64 61 42 20 00'  07AB    307         .ASCIC  " Bad data in general purpose register:!/"
75 70 20 6C 61 72 65 6E 65 67 20 6E   07B7
74 73 69 67 65 72 20 65 73 6F 70 72   07C3
                  2F 21 3A 72 65 67   07CF
                                 28   07AB
                                      07D4    308 ;-----------------------------------------------------------------------
                                      07D4    309 T_BAD_DATA:
20 4C 58 21 20 3D 20 50 58 45 20 00'  07D4    310         .ASCIC  " EXP = !XL    ACT = !XL    XOR= !XL !/"
4C 58 21 20 3D 20 54 43 41 20 20 20   07E0
4C 58 21 20 3D 52 4F 58 20 20 20 20   07EC
                        2F 21 20 20   07F8
                                 26   07D4
                                      07FB    311 ;-----------------------------------------------------------------------
                                      07FB    312 T_GOOD_DATA:
20 4C 58 21 20 3D 20 50 58 45 20 00'  07FB    313         .ASCIC  " EXP = !XL    ACT = !XL !/"
4C 58 21 20 3D 20 54 43 41 20 20 20   0807
                        2F 21 20 20   0813
                                 1A   07FB
                                      0816    314 ;-----------------------------------------------------------------------
                                      0816    315 T_PAGE0PROT:
20 6F 74 20 65 6C 62 61 6E 55 20 00'  0816    316         .ASCIC  " Unable to set proper protection on page 0.!/"
70 20 72 65 70 6F 72 70 20 74 65 73   0822
6E 6F 20 6E 6F 69 74 63 65 74 6F 72   082E
      2F 21 2E 30 20 65 67 61 70 20   083A
```

```
                                  2D  0816
                                      0844   317 ;-----------------------------------------------------------------------
                                      0844   318 T_PAGEPROT:
20 6F 74 20 65 6C 62 61 6E 55 20 00'  0844   319         .ASCIC  " Unable to set proper protection on buffer page.!/"
70 20 72 65 70 6F 72 70 20 74 65 73   0850
6E 6F 20 6E 6F 69 74 63 65 74 6F 72   085C
65 67 61 70 20 72 65 66 66 75 62 20   0868
                            2F 21 2E  0874
                                  32  0844
                                      0877   320 ;-----------------------------------------------------------------------
                                      0877   321 T_NOT_ON_KS:
72 65 4B 20 6E 6F 20 74 6F 4E 20 00'  0877   322         .ASCIC  " Not on Kernel Stack as expected.!/"
73 61 20 6B 63 61 74 53 20 6C 65 6E   0883
2F 21 2E 64 65 74 63 65 70 78 65 20   088F
                                  23  0877
                                      089B   323 ;-----------------------------------------------------------------------
                                      089B   324 T_NOT_ON_IS:
74 6E 49 20 6E 6F 20 74 6F 4E 20 00'  089B   325         .ASCIC  " Not on Interrupt Stack as expected.!/"
6B 63 61 74 53 20 74 70 75 72 72 65   08A7
64 65 74 63 65 70 78 65 20 73 61 20   08B3
                            2F 21 2E  08BF
                                  26  089B
                                      08C2   326 ;-----------------------------------------------------------------------
                                      08C2   327 T_EXP_PSL:
50 20 64 65 74 63 65 70 78 45 20 00'  08C2   328         .ASCIC  " Expected PSL   =   !_!XL(X) ; !AC!/"
21 5F 21 20 20 20 3D 20 20 20 4C 53   08CE
21 43 41 21 20 3B 20 29 58 28 4C 58   08DA
                                  2F  08E6
                                  24  08C2
                                      08E7   329 ;-----------------------------------------------------------------------
                                      08E7   330 T_ACT_PSL:
4C 53 50 20 6C 61 75 74 63 41 20 00'  08E7   331         .ASCIC  " Actual PSL     =   !_!XL(X) ; !AC!/"
21 5F 21 20 20 20 3D 20 20 20 20 20   08F3
21 43 41 21 20 3B 20 29 58 28 4C 58   08FF
                                  2F  090B
                                  24  08E7
                                      090C   332 ;-----------------------------------------------------------------------
                                      090C   333 T_PSL:
20 20 20 3D 20 20 20 4C 53 50 20 00'  090C   334         .ASCIC  " PSL   =   !_!XL (X) ; !AC!/"
20 3B 20 29 58 28 20 4C 58 21 5F 21   0918
                      2F 21 43 41 21  0924
                                  1C  090C
                                      0929   335 ;-----------------------------------------------------------------------
                                      0929   336 T_GPR:
20 20 72 65 74 73 69 67 65 52 20 00'  0929   337         .ASCIC  " Register  Expected    Actual     XOR!/"
20 20 20 20 64 65 74 63 65 70 78 45   0935
58 20 20 20 20 20 6C 61 75 74 63 41   0941
                         2F 21 52 4F  094D
                                  27  0929
                                      0951   338 ;-----------------------------------------------------------------------
                                      0951   339 T_XOR:
4C 58 21 20 20 5F 21 43 41 21 20 00'  0951   340         .ASCIC  " !AC!_  !XL   !XL   !XL!/"
4C 58 21 20 20 20 4C 58 21 20 20 20   095D
                               2F 21  0969
                                  19  0951
```

```
                                    096B   341 ;-----------------------------------------------------------------------------
                                    096B   342 T_NOXOR:
4C 58 21 20 20 5F 21 43 41 21 20 00' 096B   343          .ASCIC  " !AC!_  !XL   !XL!/"
            2F 21 4C 58 21 20 20 20  0977
                                 13  096B
                                    097F   344 ;-----------------------------------------------------------------------------
```

```
                                097F   346 .SBTTL  DATA TABLES
                                097F   347
                                097F   348 ; Table for test 1
                                097F   349
                    00000000    097F   350 DATA_1:          .LONG   ^X0             ; expected manual restart PSL
                                0983   351
                    041F0000    0983   352 DATA_2:          .LONG   ^X41F0000       ; expected PSL
                                0987   353
                    041F0008    0987   354 DATA_3:          .LONG   ^X41F0008       ; expected PSL
                                098B   355
                    041F0000    098B   356 DATA_4:          .LONG   ^X41F0000       ; expected PSL
                                098F   357
                    041F0000    098F   358 DATA_5:          .LONG   ^X41F0000       ; expected PSL
                                0993   359
                    041F0000    0993   360 DATA_6:          .LONG   ^X41F0000       ; expected PSL
                                0997   361
                    041F0000    0997   362 DATA_7:          .LONG   ^X41F0000       ; expected PSL
                                099B   363
                                099B   364
                                099B   365
                                099B   366 ERR_MESSAGE:
                                099B   367          $DS_BGNMESSAGE
                          0000  099B                .WORD   ^M<>            ; ENTRY MASK
     5E   00000084 8F    C2    099D   368          SUBL2   #BUFSIZ+4,SP            ; Reserve room on stack for cvtreg
          52   5E    D0    09A4   369          MOVL    SP,R2                   ; Save starting address of buffer
                             09A7   370          $DS_PRINTB_S    FORMAT=T_HALT_MESS
          F916 CF    9F    09A7                PUSHAB  T_HALT_MESS
     000100E0 9F    01    FB    09AB                CALLS   #$$N, @#DS$PRINTB
                             09B2   371          $DS_PRINTB_S    FORMAT=@ERR$_P1(AP)
            14 BC    9F    09B2                PUSHAB  @ERR$_P1(AP)
     000100E0 9F    01    FB    09B5                CALLS   #$$N, @#DS$PRINTB
      0B F67B CF    00    E0    09BC   372          BBS     #V_READY,L_FLAGS,1$     ; br = instruction ready to execute
                             09C2   373          $DS_PRINTB_S    FORMAT=T_NOT_READY
          FBDB CF    9F    09C2                PUSHAB  T_NOT_READY
     000100E0 9F    01    FB    09C6                CALLS   #$$N, @#DS$PRINTB
      0B F66A CF    01    E0    09CD   374 1$:     BBS     #V_DONE,L_FLAGS,2$      ; br = normal restart
                             09D3   375          $DS_PRINTB_S    FORMAT=T_NOT_DONE
          FBFC CF    9F    09D3                PUSHAB  T_NOT_DONE
     000100E0 9F    01    FB    09D7                CALLS   #$$N, @#DS$PRINTB
      0B F659 CF    02    E1    09DE   376 2$:     BBC     #V_EXECUTE_ERR,L_FLAGS,3$ ; br = instruction executed
                             09E4   377          $DS_PRINTB_S    FORMAT=T_EXECUTE
          FC19 CF    9F    09E4                PUSHAB  T_EXECUTE
     000100E0 9F    01    FB    09E8                CALLS   #$$N, @#DS$PRINTB
      0B F648 CF    03    E1    09EF   378 3$:     BBC     #V_CHMX_ERR,L_FLAGS,4$  ; br = no CHMx error
                             09F5   379          $DS_PRINTB_S    FORMAT=T_CHMX_ERR
          FC62 CF    9F    09F5                PUSHAB  T_CHMX_ERR
     000100E0 9F    01    FB    09F9                CALLS   #$$N, @#DS$PRINTB
      0B F637 CF    04    E1    0A00   380 4$:     BBC     #V_XFC_ERR,L_FLAGS,5$   ; br = no XFC error
                             0A06   381          $DS_PRINTB_S    FORMAT=T_XFC
          FC1C CF    9F    0A06                PUSHAB  T_XFC
     000100E0 9F    01    FB    0A0A                CALLS   #$$N, @#DS$PRINTB
      1F F626 CF    10    E1    0A11   382 5$:     BBC     #V_ISTK,L_FLAGS,6$      ; br = on kernel stack
      2A F620 CF    0D    E1    0A17   383          BBC     #V_KSP_ERR,L_FLAGS,7$   ; br = no KSP error
                             0A1D   384          $DS_PRINTB_S    FORMAT=T_KSP_ERR1,P0=L_EXP_KSP,P1=L_ACT_KSP
          00000000'EF    DD    0A1D                PUSHL   L_ACT_KSP
```

```
        00000000'EF   DD  0A23                          PUSHL   L_EXP_KSP
            FC8C CF   9F  0A29                          PUSHAB  T_KSP_ERR1
    000100E0 9F   03  FB  0A2D                          CALLS   #$$N, @#DS$PRINTB
                  11  11  0A34   385          BRB      7$
                          0A36   386 6$:      $DS_PRINTX_S    FORMAT=T_KSP_ERR2,P0=L_ACT_KSP
        00000000'EF   DD  0A36                          PUSHL   L_ACT_KSP
            FCA7 CF   9F  0A3C                          PUSHAB  T_KSP_ERR2
    000100E8 9F   02  FB  0A40                          CALLS   #$$N, @#DS$PRINTX
     1F F5F0 CF   10  E0  0A47   387 7$:      BBS      #V_ISTK,L_FLAGS,8$      ; br = on interrupt stack
     2A F5EA CF   0E  E1  0A4D   388          BBC      #V_ISP_ERR,L_FLAGS,9$   ; br = no ISP error
                          0A53   389          $DS_PRINTB_S    FORMAT=T_ISP_ERR1,P0=L_EXP_ISP,P1=L_ACT_ISP
        00000000'EF   DD  0A53                          PUSHL   L_ACT_ISP
        00000000'EF   DD  0A59                          PUSHL   L_EXP_ISP
            FCB2 CF   9F  0A5F                          PUSHAB  T_ISP_ERR1
    000100E0 9F   03  FB  0A63                          CALLS   #$$N, @#DS$PRINTB
                  11  11  0A6A   390          BRB      9$                      ; skip extened error report
                          0A6C   391 8$:      $DS_PRINTX_S    FORMAT=T_ISP_ERR2,P0=L_ACT_ISP
        00000000'EF   DD  0A6C                          PUSHL   L_ACT_ISP
            FCCD CF   9F  0A72                          PUSHAB  T_ISP_ERR2
    000100E8 9F   02  FB  0A76                          CALLS   #$$N, @#DS$PRINTX
     19 F5BA CF   0F  E1  0A7D   392 9$:      BBC      #V_SP_ERR,L_FLAGS,10$   ; br = no SP error
                          0A83   393          $DS_PRINTB_S    FORMAT=T_SP_ERR1,P0=L_EXP_SP,P1=L_ACT_SP
        00000000'EF   DD  0A83                          PUSHL   L_ACT_SP
        00000000'EF   DD  0A89                          PUSHL   L_EXP_SP
            FCDE CF   9F  0A8F                          PUSHAB  T_SP_ERR1
    000100E0 9F   03  FB  0A93                          CALLS   #$$N, @#DS$PRINTB
                  11  11  0A9A   394          BRB      11$                     ; skip extended error report
                          0A9C   395 10$:     $DS_PRINTX_S    FORMAT=T_SP_ERR2,P0=L_ACT_SP
        00000000'EF   DD  0A9C                          PUSHL   L_ACT_SP
            FCF9 CF   9F  0AA2                          PUSHAB  T_SP_ERR2
    000100E8 9F   02  FB  0AA6                          CALLS   #$$N, @#DS$PRINTX
     03 F58A CF   09  E0  0AAD   396 11$:     BBS      #V_PSL_ERR,L_FLAGS,12$  ; br = PSL error
                008A  31  0AB3   397          BRW      13$                     ; no PSL error
                          0AB6   398 12$:     $DS_CVTREG_S    MSB=#31,DATA=L_EXP_PSL,MNEADR=A_PSLMNE,-
                          0AB6   399                          STRBUF=(R2),MAXLEN=#BUFSIZ,-
                          0AB6   400                          V1=MODELIST,V2=MODELIST
                  00  DD  0AB6                          PUSHL   #0
                  00  DD  0AB8                          PUSHL   #0
                  00  DD  0ABA                          PUSHL   #0
                  00  DD  0ABC                          PUSHL   #0
        00000000'EF   DF  0ABE                          PUSHAL  MODELIST
        00000000'EF   DF  0AC4                          PUSHAL  MODELIST
        00000080 8F   DD  0ACA                          PUSHL   #BUFSIZ
                  62  9F  0AD0                          PUSHAB  (R2)
        00000000'EF   9F  0AD2                          PUSHAB  A_PSLMNE
        00000000'EF   DD  0AD8                          PUSHL   L_EXP_PSL
                  1F  DD  0ADE                          PUSHL   #31
    000100B0 9F   0B  FB  0AE0                          CALLS   #11, @#DS$CVTREG
                          0AE7   401          $DS_PRINTB_S    FORMAT=T_EXP_PSL,P0=L_EXP_PSL,P1=R2
                  52  DD  0AE7                          PUSHL   R2
        00000000'EF   DD  0AE9                          PUSHL   L_EXP_PSL
            FDCF CF   9F  0AEF                          PUSHAB  T_EXP_PSL
    000100E0 9F   03  FB  0AF3                          CALLS   #$$N, @#DS$PRINTB
                          0AFA   402          $DS_CVTREG_S    MSB=#31,DATA=L_ACT_PSL,MNEADR=A_PSLMNE,-
                          0AFA   403                          STRBUF=(R2),MAXLEN=#BUFSIZ,-
```

```
                                0AFA   404                          V1=MODELIST,V2=MODELIST
                      00   DD   0AFA                       PUSHL   #0
                      00   DD   0AFC                       PUSHL   #0
                      00   DD   0AFE                       PUSHL   #0
                      00   DD   0B00                       PUSHL   #0
           00000000'EF   DF   0B02                       PUSHAL  MODELIST
           00000000'EF   DF   0B08                       PUSHAL  MODELIST
           00000080 8F   DD   0B0E                       PUSHL   #BUFSIZ
                      62   9F   0B14                       PUSHAB  (R2)
           00000000'EF   9F   0B16                       PUSHAB  A_PSLMNE
           00000000'EF   DD   0B1C                       PUSHL   L_ACT_PSL
                      1F   DD   0B22                       PUSHL   #31
      000100B0 9F     0B   FB   0B24                       CALLS   #11, @#DS$CVTREG
                                0B2B   405          $DS_PRINTB_S    FORMAT=T_ACT_PSL,P0=L_ACT_PSL,P1=R2
                      52   DD   0B2B                       PUSHL   R2
           00000000'EF   DD   0B2D                       PUSHL   L_ACT_PSL
               FDB0 CF   9F   0B33                       PUSHAB  T_ACT_PSL
      000100E0 9F     03   FB   0B37                       CALLS   #$$N, @#DS$PRINTB
                      44   11   0B3E   406          BRB     14$
                                0B40   407 13$:     $DS_CVTREG_S    MSB=#31,DATA=L_EXP_PSL,MNEADR=A_PSLMNE,-
                                0B40   408                          STRBUF=(R2),MAXLEN=#BUFSIZ,-
                                0B40   409                          V1=MODELIST,V2=MODELIST
                      00   DD   0B40                       PUSHL   #0
                      00   DD   0B42                       PUSHL   #0
                      00   DD   0B44                       PUSHL   #0
                      00   DD   0B46                       PUSHL   #0
           00000000'EF   DF   0B48                       PUSHAL  MODELIST
           00000000'EF   DF   0B4E                       PUSHAL  MODELIST
           00000080 8F   DD   0B54                       PUSHL   #BUFSIZ
                      62   9F   0B5A                       PUSHAB  (R2)
           00000000'EF   9F   0B5C                       PUSHAB  A_PSLMNE
           00000000'EF   DD   0B62                       PUSHL   L_EXP_PSL
                      1F   DD   0B68                       PUSHL   #31
      000100B0 9F     0B   FB   0B6A                       CALLS   #11, @#DS$CVTREG
                                0B71   410          $DS_PRINTX_S    FORMAT=T_PSL,P0=L_EXP_PSL,P1=R2
                      52   DD   0B71                       PUSHL   R2
           00000000'EF   DD   0B73                       PUSHL   L_EXP_PSL
               FD8F CF   9F   0B79                       PUSHAB  T_PSL
      000100E8 9F     03   FB   0B7D                       CALLS   #$$N, @#DS$PRINTX
       5C F4B3 CF     0A   E1   0B84   411 14$:     BBC     #V_GPR_ERR,L_FLAGS,18$ ; br = no GPR error
                                0B8A   412          $DS_PRINTB_S    FORMAT=T_GPR
               FD9B CF   9F   0B8A                       PUSHAB  T_GPR
      000100E0 9F     01   FB   0B8E                       CALLS   #$$N, @#DS$PRINTB
      53   00000000'EF   DE   0B95   413          MOVAL   GPR_TABLE,R3                ; load address of expected data
      54   00000000'EF   D0   0B9C   414          MOVL    A_HALT_BUFFER,R4            ; load address of actual data
                      55   7C   0BA3   415          CLRQ    R5                          ; init R5 and R6 for counter and data
               57     0D   D0   0BA5   416          MOVL    #13,R7                      ; load limit
   58   00000000'EF45   DE   0BA8   417 15$:     MOVAL   REG_TABLE[R5],R8            ; load address of ascic string
      56   6445   6345   CD   0BB0   418          XORL3   (R3)[R5],(R4)[R5],R6        ; get XOR of data if bad
                      17   13   0BB6   419          BEQL    16$                         ; br = good data
                                0BB8   420          $DS_PRINTB_S    FORMAT=T_XOR,P0=R8,P1=(R3)[R5],P2=(R4)[R5],P3=R6
                      56   DD   0BB8                       PUSHL   R6
                    6445   DD   0BBA                       PUSHL   (R4)[R5]
                    6345   DD   0BBD                       PUSHL   (R3)[R5]
                      58   DD   0BC0                       PUSHL   R8
```

```
                FD8B CF    9F   0BC2                          PUSHAB  T_XOR
000100E0 9F      05    FB   0BC6                          CALLS   #$$N, a#DS$PRINTB
                 13    11   0BCD    421          BRB     17$                     ; check if finished
                             0BCF    422 16$:     $DS_PRINTX_S    FORMAT=T_NOXOR,P0=R8,P1=(R3)[R5],P2=(R4)[R5]
                6445   DD   0BCF                          PUSHL   (R4)[R5]
                6345   DD   0BD2                          PUSHL   (R3)[R5]
                  58   DD   0BD5                          PUSHL   R8
                FD90 CF    9F   0BD7                          PUSHAB  T_NOXOR
000100E8 9F      04    FB   0BDB                          CALLS   #$$N, a#DS$PRINTX
      C2 55      57    F3   0BE2    423 17$:     AOBLEQ  R7,R5,15$
 0B F451 CF      05    E1   0BE6    424 18$:     BBC     #V_TIMER,L_FLAGS,19$    ; br = no timer error
                             0BEC    425          $DS_PRINTB_S    FORMAT=T_TIMER
                FAA1 CF    9F   0BEC                          PUSHAB  T_TIMER
000100E0 9F      01    FB   0BF0                          CALLS   #$$N, a#DS$PRINTB
                             0BF7    426 19$:
                             0BF7    427          $DS_ENDMESSAGE
                         04  0BF7                          RET                     ; RETURN TO DIAGNOSTIC SUPERVISOR
                             0BF8    428
```

```
                                  0BF8   .SBTTL  SUBROUTINES
                                  0BF8
                                  0BF8   ; This routine will clear the first 4 longwords of memory to disable
                                  0BF8   ; a Restart Parameter Block if one exists.
                                  0BF8
                                  0BF8   CLEAR_RPB:
                  54    00    D0  0BF8           MOVL    #0,R4            ; load R4 with starting address
                        84    7C  0BFB           CLRQ    (R4)+            ; clear first two longwords
                        64    7C  0BFD           CLRQ    (R4)             ; clear last two longwords
                              05  0BFF           RSB                      ; return
                                  0C00
                                  0C00   ; This routine will setup a Restart Parameter Block at location 0
                                  0C00   ; that points to locaion 100 to handle processor halts when operating
                                  0C00   ; in automatic restart mode.
                                  0C00
                                  0C00   SETUP_RPB:
                  54    00    D0  0C00           MOVL    #0,R4            ; load R4 with address to build RPB
                  84    00    D0  0C03           MOVL    #0,(R4)+         ; load first longword with address
          84   00000100'EF    DE  0C06           MOVAL   RESTART,(R4)+    ; load second longword with routine address
          55   00000100'EF    DE  0C0D           MOVAL   RESTART,R5       ; load restart address to calc checksum
                        56    D4  0C14           CLRL    R6               ; initialize R6 to store checksum
              F3FD CF   01    D0  0C16           MOVL    #1,L_COUNT       ; initialize counter
                  56    85    C0  0C1B   1$:     ADDL2   (R5)+,R6         ; add longword checksum
           F7 F3F5 CF   1F    F3  0C1E           AOBLEQ  #^X1F,L_COUNT,1$ ; br = not finished
                  84    56    D0  0C24           MOVL    R6,(R4)+         ; load RPB with checksum
                        64    D4  0C27           CLRL    (R4)             ; disable warm restart flag
                              05  0C29           RSB                      ; return
                                  0C2A
                                  0C2A   ; This routine will clear the buffer area.
                                  0C2A
                                  0C2A   CLEAR_BUFFER:
          55   00000000'FF    DE  0C2A           MOVAL   @A_HALT_BUFFER,R5 ; get starting buffer address
                  F3E3 CF     D4  0C31           CLRL    L_COUNT          ; initialize counter
                        85    D4  0C35   1$:     CLRL    (R5)+            ; clear a buffer location
   F4 F3D8 CF   00000100 8F   F3  0C37           AOBLEQ  #256,L_COUNT,1$  ; br = not finished
                              05  0C41           RSB                      ; return
                                  0C42
                                  0C42   ; This routine will load general purpose registers R0 to R11 with data and
                                  0C42   ; read the AP and FP befor a halt is tested.
                                  0C42
                                  0C42   LOAD_GPR:
          5B   00000000'EF    DE  0C42           MOVAL   GPR_TABLE,R11    ; load address of data table to load GPR's
                  50    8B    7D  0C49           MOVQ    (R11)+,R0        ; move data into R0 and R1
                  52    8B    7D  0C4C           MOVQ    (R11)+,R2        ; move data into R2 and R3
                  54    8B    7D  0C4F           MOVQ    (R11)+,R4        ; move data into R4 and R5
                  56    8B    7D  0C52           MOVQ    (R11)+,R6        ; move data into R6 and R7
                  58    8B    7D  0C55           MOVQ    (R11)+,R8        ; move data into R8 and R9
                  5A    8B    7D  0C58           MOVQ    (R11)+,R10       ; move data into R10 and R11
          00000000'EF   5C    D0  0C5B           MOVL    AP,L_EXP_AP      ; move contents of AP into expected data table
          00000000'EF   5D    D0  0C62           MOVL    FP,L_EXP_FP      ; move contents of FP into expected data table
                              05  0C69           RSB                      ; return
                                  0C6A
                                  0C6A   ; This routine will read general purpose registers R0 to R11 , the AP, FP, SP
                                  0C6A   ; KSP, ISP and PSL into a buffer area (A_HALT_BUFFER) to check data patterns
                                  0C6A   ; and data after a halt. It will then retrun to to address contained in
```

```
                                0C6A   485 ; RENTRY_POINT.
                                0C6A   486
                                0C6A   487 READ_GPR:
          00000000'FF   50   7D  0C6A   488         MOVQ    R0,@A_HALT_BUFFER ; move contents of R0 and R1 into buffer
          50   00000000'EF   D0  0C71   489         MOVL    A_HALT_BUFFER,R0 ; load R0 with address of buffer
                    50   08   C0  0C78   490         ADDL2   #8,R0             ; get over first two words
                    80   52   7D  0C7B   491         MOVQ    R2,(R0)+          ; move contents of R2 and R3 into buffer
                    80   54   7D  0C7E   492         MOVQ    R4,(R0)+          ; move R4 and R5
                    80   56   7D  0C81   493         MOVQ    R6,(R0)+          ; move R6 and R7
                    80   58   7D  0C84   494         MOVQ    R8,(R0)+          ; move R8 and R9
                    80   5A   7D  0C87   495         MOVQ    R10,(R0)+         ; move R10 and R11
                    80   5C   D0  0C8A   496         MOVL    AP,(R0)+          ; move AP
                    80   5D   D0  0C8D   497         MOVL    FP,(R0)+          ; move FP
          00000000'EF   5E   D0  0C90   498         MOVL    SP,L_ACT_SP       ; move SP
00000000'EF   00000000'8F   DB  0C97   499         MFPR    #PR$_KSP,L_ACT_KSP ; move KSP
00000000'EF   00000000'8F   DB  0CA2   500         MFPR    #PR$_ISP,L_ACT_ISP ; move ISP
          00000000'EF   DC  0CAD   501         MOVPSL  L_ACT_PSL         ; move PSL
               F34D DF   17  0CB3   502         JMP     @RENTRY_POINT     ; return to subtest
                                0CB7   503
                                0CB7   504
                                0CB7   505 ; This routine will service unexpected interval timer interrupts and set an
                                0CB7   506 ; error flag.
                                0CB7   507
                                0CB7   508         .ALIGN  LONG
                                0CB8   509 TIMER_SERVICE:
                    00'   00   DA  0CB8   510         MTPR    #0,S^#PR$_ICCS          ; Turn off the timer
               F37C CF    20   C8  0CBB   511         BISL2   #M_TIMER,L_FLAGS        ; set error flag
                          02   02  0CC0   512         REI                             ; return
                                0CC1   513
                                0CC1   514
                                0CC1   515 ; This routine will service unexpected CHANGE MODE exceptions and set
                                0CC1   516 ; an error flag.
                                0CC1   517
                                0CC1   518         .ALIGN  LONG
                                0CC4   519 CHMX_SERVICE:
               F373 CF    08   C8  0CC4   520         BISL2   #M_CHMX_ERR,L_FLAGS ; set error flag
                          8E   D5  0CC9   521         TSTL    (SP)+             ; get change mode argument off stack
                          02   02  0CCB   522         REI                       ; return
                                0CCC   523
                                0CCC   524 ; This routine will service unexpected XFC exceptions and set a flag
                                0CCC   525 ; to indicate the error.
                                0CCC   526
                                0CCC   527         .ALIGN  LONG
                                0CCC   528 XFC_ERROR:
               F36B CF    10   C8  0CCC   529         BISL2   #M_XFC_ERR,L_FLAGS ; set error flag
                    6E    01   C0  0CD1   530         ADDL2   #1,(SP)           ; update the pc for the REI
                          02   02  0CD4   531         REI                       ; return
                                0CD5   532
                                0CD5   533 ; This routine will service expected XFC exceptions and set a flag to
                                0CD5   534 ; indicate successful completion of the operation.
                                0CD5   535
                                0CD5   536         .ALIGN  LONG
                                0CD8   537 XFC_SERVICE:
F35B CF    00000800   8F   C8  0CD8   538         BISL2   #M_XFC,L_FLAGS    ; set flag
                    6E    01   C0  0CE1   539         ADDL2   #1,(SP)           ; update the pc for the REI
```

```
                    02  0CE4     540          REI                         ; return
                        0CE5     541
                        0CE5     542 ; This routine is called after execution of an instruction which should cause
                        0CE5     543 ; a halt. The PSL, SP, KSP, ISP, GENERAL PURPOSE REGISTERS and FLAG BYTE are
                        0CE5     544 ; examined for expected information. If an error exists, a flag is set to
                        0CE5     545 ; indicate that it should be reported.
                        0CE5     546
                        0CE5     547 ERROR_CHECK::
                    57  D4  0CE5  548          CLRL    R7                  ; initialize counter
                55  0D  D0  0CE7  549          MOVL    #13,R5              ; set limit
           53   00000000'EF  D0  0CEA  550          MOVL    A_HALT_BUFFER,R3 ; load address of actual data to check
           54   00000000'EF  DE  0CF1  551          MOVAL   GPR_TABLE,R4    ; load address of expected data
                84  83  D1  0CF8  552 1$:      CMPL    (R3)+,(R4)+         ; check data
                    09  13  0CFB  553          BEQL    2$                  ; br = data is good
     F336 CF    00001400 8F  C8  0CFD  554          BISL2   #M_ERROR_FLAG!M_GPR_ERR,L_FLAGS ; set GPR and error flag
                 EE 57  55  F3  0D06  555 2$:      AOBLEQ  R5,R7,1$            ; br = not finished
00000000'EF   00000000'EF  D1  0D0A  556          CMPL    L_ACT_SP,L_EXP_SP ; check SP
                    09  13  0D15  557          BEQL    3$                  ; br = SP is good
     F31C CF    00009000 8F  C8  0D17  558          BISL2   #M_SP_ERR!M_ERROR_FLAG,L_FLAGS ; set SP and error flag
       1F 00000000'EF   1A  E1  0D20  559 3$:      BBC     #PSL$V_IS,L_ACT_PSL,4$ ; br = on KS no possible error
     F30B CF    00010000 8F  C8  0D28  560          BISL2   #M_ISTK,L_FLAGS ; set interrupt stack flag
00000000'EF   00000000'EF  D1  0D31  561          CMPL    L_ACT_KSP,L_EXP_KSP ; check KSP
                    09  13  0D3C  562          BEQL    4$                  ; br = KSP is good
     F2F5 CF    00003000 8F  C8  0D3E  563          BISL2   #M_KSP_ERR!M_ERROR_FLAG,L_FLAGS ; set KSP and error flag
           16 F2F0 CF   10  E0  0D47  564 4$:      BBS     #V_ISTK,L_FLAGS,5$ ; br = on IS no possible error
00000000'EF   00000000'EF  D1  0D4D  565          CMPL    L_ACT_ISP,L_EXP_ISP ; check ISP
                    09  13  0D58  566          BEQL    5$                  ; br = ISP is good
     F2D9 CF    00005000 8F  C8  0D5A  567          BISL2   #M_ISP_ERR!M_ERROR_FLAG,L_FLAGS ; set ISP and error flag
00000000'EF   00000000'EF  D1  0D63  568 5$:      CMPL    L_ACT_PSL,L_EXP_PSL ; check PSL
                    42  13  0D6E  569          BEQL    8$                  ; br = PSL is good
                02  18  EF  0D70  570          EXTZV   #PSL$V_CURMOD,#PSL$S_CURMOD,-
     F2A9 CF    00000000'EF      0D73  571                                  L_EXP_PSL,L_EXP_MOD ; extract current mode from expected psl
                02  18  ED  0D7B  572          CMPZV   #PSL$V_CURMOD,#PSL$S_CURMOD,-
     F29E CF    00000000'EF      0D7E  573                                  L_ACT_PSL,L_EXP_MOD ; check current mode for error
                    18  12  0D86  574          BNEQ    6$                  ; br = wrong mode
                01  1A  EF  0D88  575          EXTZV   #PSL$V_IS,#1,-
     F295 CF    00000000'EF      0D8B  576                                  L_EXP_PSL,L_EXP_STACK ; extract stack from expected PSL
                01  1A  ED  0D93  577          CMPZV   #PSL$V_IS,#1,-
     F28A CF    00000000'EF      0D96  578                                  L_ACT_PSL,L_EXP_STACK ; check current stack for error
                    09  13  0D9E  579          BEQL    7$                  ; br = mode is good
     F293 CF    00000100 8F  C8  0DA0  580 6$:      BISL2   #M_FATAL_ERR,L_FLAGS ; signal fatal error
     F28A CF    00001200 8F  C8  0DA9  581 7$:      BISL2   #M_PSL_ERR!M_ERROR_FLAG,L_FLAGS ; set PSL and error flag
        09 F285 CF   00  E0  0DB2  582 8$:      BBS     #V_READY,L_FLAGS,9$ ; br = no ready error
     F27B CF    00001000 8F  C8  0DB8  583          BISL2   #M_ERROR_FLAG,L_FLAGS ; set error flag
        09 F276 CF   02  E1  0DC1  584 9$:      BBC     #V_EXECUTE_ERR,L_FLAGS,10$ ; br = no execute error
     F26C CF    00001000 8F  C8  0DC7  585          BISL2   #M_ERROR_FLAG,L_FLAGS ; set error flag
        09 F267 CF   01  E0  0DD0  586 10$:     BBS     #V_DONE,L_FLAGS,11$ ; br = no done error
     F25D CF    00001000 8F  C8  0DD6  587          BISL2   #M_ERROR_FLAG,L_FLAGS ; set error flag
        09 F258 CF   03  E1  0DDF  588 11$:     BBC     #V_CHMX_ERR,L_FLAGS,12$ ; br = no unexpected CHMx exception
     F24E CF    00001000 8F  C8  0DE5  589          BISL2   #M_ERROR_FLAG,L_FLAGS ; set error flag
        09 F249 CF   04  E1  0DEE  590 12$:     BBC     #V_XFC_ERR,L_FLAGS,13$ ; br = no unexpected XFC exception
     F23F CF    00001000 8F  C8  0DF4  591          BISL2   #M_ERROR_FLAG,L_FLAGS ; set error flag
        09 F23A CF   05  E1  0DFD  592 13$:     BBC     #V_TIMER,L_FLAGS,14$ ; br = no unexpected timer interrupt
     F230 CF    00001000 8F  C8  0E03  593          BISL2   #M_ERROR_FLAG,L_FLAGS ; set error flag
                    05  0E0C  594 14$:     RSB                         ; return
```

```
                    0E0D   595
                    0E0D   596          $DS_PAGE
```

```
                                0E0D                    .SBTTL  TEST 4:  PROCESSOR HALTS ARCHITECTURALLY DEFINED
                             00000000                           .PSECT  TEST_004, PAGE, NOWRT
                                 002C
                                 002C    599 ;++
                                 002C    600 ; Test description:
                                 002C    601 ;
                                 002C    602 ;       This test checks the various ways the VAX-11/750 processor can
                                 002C    603 ;       be halted in an architecturally defined manner. This includes
                                 002C    604 ;       executing a HALT instruction in kernel mode, attempting
                                 002C    605 ;       certain references to an invalid interrupt stack and executing
                                 002C    606 ;       change mode instructions when the IS bit of the PSL is set.
                                 002C    607 ;
                                 002C    608 ;--
                                 002C    609
                                 002C    610
                                 002C    611             $DS_BGNTEST     <MANUAL,HALT,ALL>
                                 002C        DATA_004:
                         00000000  002C                  .LONG   0                       ; TEST ARGUMENT TABLE TERMINATOR
                                 0030        TEST_004::
                             0000  0030                  .WORD   ^M<>                    ; ENTRY MASK
                                 0032    612             $DS_BOPER  5$                   ; breach if operatoer present
                           0C    E0  0032                  BBS     #DSA$V_OPER,-         ; BR IF OPERATOR
                 14 0000FE00     9F  0034                          @#DSA$GL_FLAGS, 5$
                                 003A    613             $DS_PRINTF_S    FORMAT=T_NO_OPER        ;5.2
                    0000004D'EF  9F  003A                  PUSHAB  T_NO_OPER
            000100F0 9F    01    FB  0040                  CALLS   #$$N, @#DS$PRINTF
                                 0047    614             $DS_ABORT                       ; else, abort
            00010020 9F    6C    FA  0047                  CALLG   (AP), @#DS$ABORT
                                 004E    615 5$:         $DS_PRINTF_S    FORMAT=T_WARNING
                 00000262'EF    9F  004E                  PUSHAB  T_WARNING
            000100F0 9F    01    FB  0054                  CALLS   #$$N, @#DS$PRINTF
            00000000'EF    5E    D0  005B    616         MOVL    SP,L_KSP                ; save initial KSP
    00000000'EF    00000000'8F    DB  0062    617         MFPR    #PR$_ISP,L_ISP          ; save initial ISP
                 00000C2A'EF    16  006D    618         JSB     CLEAR_BUFFER            ; clear buffer area
                                 0073    619         $DS_SETVEC_S    VECTOR=#SCB$L_TIMER, SRVADR=TIMER_SERVICE
                           00    DD  0073                  PUSHL   #0
                 00000CB8'EF    DF  0075                  PUSHAL  TIMER_SERVICE
                 000000C0 8F    DD  007B                  PUSHL   #SCB$L_TIMER
            00010160 9F    03    FB  0081                  CALLS   #3, @#DS$SETVEC
                                 0088    620 1$:
                                 0088    621         $DS_PAGE
```

```
                     0088                .SBTTL  SUBTEST 4.1:  HALT instruction in Kernel Mode
                     0088    624 ;+
                     0088    625 ; Subtest description:
                     0088    626 ;
                     0088    627 ;       This subtest checks that the HALT instruction halts the processor
                     0088    628 ;       when executed in kernel mode (code = 6).
                     0088    629 ;
                     0088    630 ; Assumptions:
                     0088    631 ;
                     0088    632 ; Subtest steps:
                     0088    633 ;
                     0088    634 ;       SUBTEST Halt instruction in Kernel Mode
                     0088    635 ;       : Clear RPB from location 0 in memory
                     0088    636 ;       : Initialize Flags
                     0088    637 ;       : Setup code to set done flag at loc 100
                     0088    638 ;       : Setup a jump to READ_GPR point at next loc
                     0088    639 ;       : IF operator present
                     0088    640 ;       : : THEN
                     0088    641 ;       : : Print instructions to operator
                     0088    642 ;       : ENDIF
                     0088    643 ;       : IF operator NOT present
                     0088    644 ;       : : THEN
                     0088    645 ;       : : Setup RPB at loc 0 pointing to loc 100
                     0088    646 ;       : ENDIF
                     0088    647 ;       : Load expected data for stacks
                     0088    648 ;       : Load GPR's with data
                     0088    649 ;       : Set ready to execute flag
                     0088    650 ;       : Execute HALT
                     0088    651 ;       : IF halt not executed properly
                     0088    652 ;       : : THEN
                     0088    653 ;       : : (will continue inline execution and get here)
                     0088    654 ;       : : Set halt execution error flag
                     0088    655 ;       : ENDIF
                     0088    656 ;       : Rentry point (restart will enter here)
                     0088    657 ;       : Go check FLAGS, PSL, KSP, ISP, SP and GPR's for errors
                     0088    658 ;       : IF any errors
                     0088    659 ;       : : THEN
                     0088    660 ;       : : Report errors
                     0088    661 ;       : ENDIF
                     0088    662 ;       : IF fatal error
                     0088    663 ;       : : THEN
                     0088    664 ;       : : Abort test
                     0088    665 ;       : ENDIF
                     0088    666 ;       ENDSUBTEST Halt instruction in kernel mode
                     0088    667 ;
                     0088    668 ;-
                     0088    669
                     0088    670             $DS_BGNSUB
                     0088        T4_S1::
00010030 9F          0088                    CALLG   $S$, a#DS$BGNSUB
         00000000'EF FA  0088
         00000BF8'EF 16  0093    671         JSB     CLEAR_RPB               ; disable restart parameter block
         00000C2A'EF 16  0099    672         JSB     CLEAR_BUFFER            ; clear data buffers
         0000003C'EF D4  009F    673         CLRL    L_FLAGS                 ; initialize flags
00000100'EF 00000040'EF 7D  00A5    674         MOVQ    JUMP,RESTART            ; load loc 100 with rentry code
00000108'EF 00000048'EF 7D  00B0    675         MOVQ    JUMP+8,RESTART+8        ; load rest of rentry code
```

```
00000004'EF   00000159'EF   DE  00BB   676          MOVAL   RENTRY1,RENTRY_POINT     ; load rentry address
      08 0000FE00'EF   0C   E0  00C6   677          BBS     #DSA$V_OPER,DSA$GL_FLAGS,1$ ; skip RPB if operator present
              00000C00'EF   16  00CE   678          JSB     SETUP_RPB                 ; build restart parameter block
                        22  11  00D4   679          BRB     2$                        ; skip message to operator
                                00D6   680 1$:      $DS_PRINTF_S    FORMAT=T_INSTRUCTIONS, P0=#4$, P1=#CODE_06
                        06  DD  00D6                        PUSHL   #CODE_06
              00000152'8F   DD  00D8                        PUSHL   #4$
              000001DC'EF   9F  00DE                        PUSHAB  T_INSTRUCTIONS
         000100F0 9F   03   FB  00E4                        CALLS   #$$N, a#DS$PRINTF
                                00EB   681          $DS_PRINTF_S    FORMAT=T_CONTINUE
              00000212'EF   9F  00EB                        PUSHAB  T_CONTINUE
         000100F0 9F   01   FB  00F1                        CALLS   #$$N, a#DS$PRINTF
00000000'EF   00000000'EF   D0  00F8   682 2$:      MOVL    L_KSP,L_EXP_SP            ; load expected SP
              00000000'EF   D4  0103   683          CLRL    L_EXP_KSP                 ; KSP unpredictable if on kernel stack
00000000'EF   00000000'EF   D0  0109   684          MOVL    L_ISP,L_EXP_ISP           ; load expected ISP
00000000'EF   0000097F'EF   D0  0114   685          MOVL    DATA_1,L_EXP_PSL          ; load expected PSL
              00000C42'EF   16  011F   686          JSB     LOAD_GPR                  ; load GPR data and read AP & FP
      1D 0000FE00'EF   0C   E0  0125   687          BBS     #DSA$V_OPER,DSA$GL_FLAGS,3$ ; br = operator present
00000000'EF   00000983'EF   D0  012D   688          MOVL    DATA_1+4,L_EXP_PSL        ; load PSL for auto restart
         00000000'EF   06   D0  0138   689          MOVL    #6,L_EXP_AP               ; load AP for auto restart
00000000'EF   00000200 8F   D0  013F   690          MOVL    #^X200,L_EXP_SP           ; load SP for auto restart
         0000003C'EF   01   C8  014A   691 3$:      BISL2   #M_READY,L_FLAGS          ; set ready to execute flag
                            00  0151   692          HALT                              ; execute HALT instruction (should
                                0152   693                                            ; halt and continue at rentry point)
         0000003C'EF   04   C8  0152   694 4$:      BISL2   #M_EXECUTE_ERR,L_FLAGS    ; halt not executed, set error flag
                                0159   695 RENTRY1:                                   ; rentry point after executing halt
         5E   00000000'EF   D0  0159   696          MOVL    L_KSP,SP                  ; reset SP
              00000CE5'EF   16  0160   697          JSB     ERROR_CHECK               ; check for errors
      23 0000003C'EF   0C   E1  0166   698          BBC     #V_ERROR_FLAG,L_FLAGS,5$ ; br = no errors
                                016E   699          $DS_ERRHARD_S   UNIT =#0,PRLINK=ERR_MESSAGE,P1=#T_HALT_ERR
              000002F1'8F   DD  016E                        PUSHL   #T_HALT_ERR
              0000099B'EF   DF  0174                        PUSHAL  ERR_MESSAGE
                        00  DD  017A                        PUSHL   #0
                        00  DD  017C                        PUSHL   #0
                        01  DD  017E                        PUSHL   #$ER
                                0180       ;;; TEST 4, SUBTEST 1, ERROR 1
         000100D0 9F   05   FB  0180                        CALLS   #$$M, a#DS$ERRHARD
                                0187   700          $DS_BCOMPLETE   5$
                     07 50  E8  0187                        BLBS    R0, 5$
                                018A   701          $DS_ABORT
         00010020 9F   6C   FA  018A                        CALLG   (AP), a#DS$ABORT
      07 0000003C'EF   08   E1  0191   702 5$:      BBC     #V_FATAL_ERR,L_FLAGS,6$ ; br = no fatal errors
                                0199   703          $DS_ABORT
         00010020 9F   6C   FA  0199                        CALLG   (AP), a#DS$ABORT
                                01A0   704 6$:      $DS_ENDSUB
                                01A0       T4_S1_X:
00010038 9F   00000000'EF   FA  01A0                        CALLG   $S$, a#DS$ENDSUB
                                01AB   705          $DS_PAGE
```

```
01AB                    .SBTTL  SUBTEST 4.2:  Interrupt Stack invalid
01AB    708 ;*
01AB    709 ; Subtest description:
01AB    710 ;
01AB    711 ;       This subtest checks that an interrupt stack which is located on
01AB    712 ;       a page which is protected to kernel read only, will halt the processor
01AB    713 ;       when a write is attempted. An XFC instruction is executed to get onto
01AB    714 ;       the interrupt stack prior to invalidating the interrupt stack pointer.
01AB    715 ;       A second XFC instruction is executed with the vector specifying the
01AB    716 ;       interrupt stack for service. When the XFC instruction is executed
01AB    717 ;       there is an attempt to write the PC and PSL on the interrupt stack.
01AB    718 ;       When this happens an "Interrupt Stack not valid HALT" should occur
01AB    719 ;       (halt code = 4). Memory management is on for this subtest.
01AB    720 ;
01AB    721 ; Subtest steps:
01AB    722 ;
01AB    723 ;       SUBTEST Interrupt Stack invalid
01AB    724 ;       :  Initialize Flags
01AB    725 ;       :  Clear RPB from location 0 in memory
01AB    726 ;       :  Turn memory management on
01AB    727 ;       :  Set page0 protection to kernel write access
01AB    728 ;       :  IF unsucessful
01AB    729 ;       :  :  THEN
01AB    730 ;       :  :  Report system error
01AB    731 ;       :  :  Abort program
01AB    732 ;       :  ENDIF
01AB    733 ;       :  Get XFC vector to handle on interrupt stack
01AB    734 ;       :  Execute XFC instruction
01AB    735 ;       :  IF not on the interrupt stack
01AB    736 ;       :  :  THEN
01AB    737 ;       :  :  Report system error
01AB    738 ;       :  :  Abort program
01AB    739 ;       :  ENDIF
01AB    740 ;       :  Release XFC vector
01AB    741 ;       :  Get XFC vector to handle on interrupt stack
01AB    742 ;       :  Setup code to set done flag at loc 100
01AB    743 ;       :  Setup a jump to READ_GPR at next loc
01AB    744 ;       :  Save current IS SP to reset after subtest is complete
01AB    745 ;       :  Set interrupt stack pointer to buffer area
01AB    746 ;       :  Invalidate buffer page (kernel read only access)
01AB    747 ;       :  IF unsucessful
01AB    748 ;       :  :  THEN
01AB    749 ;       :  :  Report system error
01AB    750 ;       :  :  Abort program
01AB    751 ;       :  ENDIF
01AB    752 ;       :  IF operator present
01AB    753 ;       :  :  THEN
01AB    754 ;       :  :  Print instructions to operator
01AB    755 ;       :  ENDIF
01AB    756 ;       :  IF operator NOT present
01AB    757 ;       :  :  THEN
01AB    758 ;       :  :  Setup RPB at loc 0 pointing to loc 100
01AB    759 ;       :  ENDIF
01AB    760 ;       :  Setup all expected data
01AB    761 ;       :  Load GPR's with data
```

```
                     01AB   762 ;       :  Set ready to execute flag
                     01AB   763 ;       :  Execute XFC to cause exception to attempt to write PC and PSL on IS
                     01AB   764 ;       :  (this should cause an interrupt stack not valid HALT)
                     01AB   765 ;       :  IF XFC not executed properly
                     01AB   766 ;       :  :  THEN
                     01AB   767 ;       :  :  (will continue in line execution and get here)
                     01AB   768 ;       :  :  Set XFC execution error flag
                     01AB   769 ;       :  ENDIF
                     01AB   770 ;       :  Rentry point (restart will enter here)
                     01AB   771 ;       :  Read  PSL
                     01AB   772 ;       :  IF on IS as expected
                     01AB   773 ;       :  :  THEN
                     01AB   774 ;       :  :  Restore IS SP
                     01AB   775 ;       :  ENDIF
                     01AB   776 ;       :  Go check FLAGS, PSL, KSP, ISP, SP and GPR'S for errors
                     01AB   777 ;       :   (Either the KSP or ISP will be UNPREDICTABLE depending on the
                     01AB   778 ;       :   current stack, this is machine dependant)
                     01AB   779 ;       :  IF any errors
                     01AB   780 ;       :  :  THEN
                     01AB   781 ;       :  :  Report errors
                     01AB   782 ;       :  ENDIF
                     01AB   783 ;       :  IF fatal error
                     01AB   784 ;       :  :  THEN
                     01AB   785 ;       :  :  Abort program
                     01AB   786 ;       :  ENDIF
                     01AB   787 ;       :  Reset protection on buffer page to original protection
                     01AB   788 ;       :  Turn memory management off
                     01AB   789 ;       :  Release XFC vector
                     01AB   790 ;       ENDSUBTEST Interrupt Stack invalid
                     01AB   791 ;
                     01AB   792 ;-
                     01AB   793
                     01AB   794          $DS_BGNSUB
                     01AB       T4_S2::
00010030 9F   0000000C'EF    FA 01AB                CALLG   $S$, a#DS$BGNSUB
              00000BF8'EF    16 01B6   795          JSB     CLEAR_RPB                ; disable restart parameter block
              00000C2A'EF    16 01BC   796          JSB     CLEAR_BUFFER             ; clear data buffers
              0000003C'EF    D4 01C2   797          CLRL    L_FLAGS                  ; initialize flags
              00000010'EF    D4 01C8   798          CLRL    L_PAGEZERO               ; set page zero to 0
                             01CE   799          $DS_MMON_S                       ; turn memory management on
                     00010150 9F   00    FB 01CE                CALLS   #0, a#DS$MMON
                             01D5   800          $SETPRT_S       INADR=L_PAGEZERO,PROT=#PRT$C_KW
                                 00    DD 01D5                PUSHL   #0
                          00000000'8F    DD 01D7                PUSHL   #PRT$C_KW
                                 00    DD 01DD                PUSHL   #0
                                 00    DD 01DF                PUSHL   #0
                          00000010'EF    7F 01E1                PUSHAQ  L_PAGEZERO
                     00010430'GF   05    FB 01E7                CALLS   #5,G^SYS$SETPRT
                             01EE   801          $DS_BCOMPLETE   1$
                               1A 50    E8 01EE                BLBS    R0, 1$
                             01F1   802          $DS_ERRSYS_S    UNIT=#0,MSGADR=T_PAGE0PROT
                                 00    DD 01F1                PUSHL   #0
                          00000816'EF    DF 01F3                PUSHAL  T_PAGE0PROT
                                 00    DD 01F9                PUSHL   #0
                                 01    DD 01FB                PUSHL   #$ER
```

```
                                  01FD        ;;; TEST 4, SUBTEST 2, ERROR 1
        000100C0 9F    04    FB   01FD                        CALLS   #$$M, a#DS$ERRSYS
                                  0204    803          $DS_ABORT
        00010020 9F    6C    FA   0204                        CALLG   (AP), a#DS$ABORT
                                  020B    804 1$:      $DS_SETVEC_S    VECTOR=#SCB$L_OPCCUS,SRVADR=RENTRY2,CODE=#1
                       01    DD   020B                        PUSHL   #1
             00000220'EF     DF   020D                        PUSHAL  RENTRY2
                       14    DD   0213                        PUSHL   #SCB$L_OPCCUS
        00010160 9F    03    FB   0215                        CALLS   #3, a#DS$SETVEC
                             FC   021C    805 2$:      XFC
                                  021D    806          .ALIGN  LONG
                                  0220    807 RENTRY2:
             00000000'EF     DC   0220    808          MOVPSL  L_ACT_PSL
     1A 00000000'EF    1A    E0   0226    809          BBS     #PSL$V_IS,L_ACT_PSL,3$
                                  022E    810          $DS_ERRHARD_S   UNIT=#0,MSGADR=T_NOT_ON_IS
                       00    DD   022E                        PUSHL   #0
             0000089B'EF     DF   0230                        PUSHAL  T_NOT_ON_IS
                       00    DD   0236                        PUSHL   #0
                       02    DD   0238                        PUSHL   #$ER
                                  023A        ;;; TEST 4, SUBTEST 2, ERROR 2
        000100D0 9F    04    FB   023A                        CALLS   #$$M, a#DS$ERRHARD
                                  0241    811          $DS_ABORT
        00010020 9F    6C    FA   0241                        CALLG   (AP), a#DS$ABORT
                                  0248    812 3$:      $DS_CLRVEC_S    VECTOR=#SCB$L_OPCCUS
                       14    DD   0248                        PUSHL   #SCB$L_OPCCUS
        00010168 9F    01    FB   024A                        CALLS   #1, a#DS$CLRVEC
                                  0251    813          $DS_SETVEC_S    VECTOR=#SCB$L_OPCCUS,SRVADR=XFC_SERVICE,CODE=#1
                       01    DD   0251                        PUSHL   #1
             00000CD8'EF     DF   0253                        PUSHAL  XFC_SERVICE
                       14    DD   0259                        PUSHL   #SCB$L_OPCCUS
        00010160 9F    03    FB   025B                        CALLS   #3, a#DS$SETVEC
00000100'EF  00000040'EF     7D   0262    814 4$:      MOVQ    JUMP,RESTART                ; setup code to renter after halt
00000108'EF  00000048'EF     7D   026D    815          MOVQ    JUMP+8,RESTART+8            ; load rest of rentry code
00000004'EF  00000363'EF     DE   0278    816          MOVAL   RENTRY3,RENTRY_POINT        ; load rentry address
     08 0000FE00'EF    0C    E0   028A    818          BBS     #DSA$V_OPER,DSA$GL_FLAGS,5$ ; br = operator present
             00000C00'EF     16   0292    819          JSB     SETUP_RPB                   ; no operator, use auto restart
                       22    11   0298    820          BRB     6$                          ; skip over message
                                  029A    821 5$:      $DS_PRINTF_S    FORMAT=T_INSTRUCTIONS,P0=#8$,P1=#CODE_04
                       04    DD   029A                        PUSHL   #CODE_04
             0000035B'8F     DD   029C                        PUSHL   #8$
             000001DC'EF     9F   02A2                        PUSHAB  T_INSTRUCTIONS
        000100F0 9F    03    FB   02A8                        CALLS   #$$N, a#DS$PRINTF
                                  02AF    822          $DS_PRINTF_S    FORMAT=T_CONTINUE
             00000212'EF     9F   02AF                        PUSHAB  T_CONTINUE
        000100F0 9F    01    FB   02B5                        CALLS   #$$N, a#DS$PRINTF
0000001C'EF  00000000'EF     D0   02BC    823 6$:      MOVL    A_BUFFER_BEGIN,L_ADDRESS ; get starting address of buffer
00000008'EF  0000001C'EF     D0   02C7    824          MOVL    L_ADDRESS,L_PAGESTRT        ; load address of page to change
0000000C'EF  0000001C'EF     D0   02D2    825          MOVL    L_ADDRESS,L_PAGEND          ; protection in 2 longword array
        0000001C'EF    28    C0   02DD    826          ADDL2   #40,L_ADDRESS               ; point into protected page
                                  02E4    827          $SETPRT_S INADR=L_PAGESTRT,PROT=#PRT$C_KR,PRVPRT=L_OLDPROT
             0000002C'EF     9F   02E4                        PUSHAB  L_OLDPROT
             00000000'8F     DD   02EA                        PUSHL   #PRT$C_KR
                       00    DD   02F0                        PUSHL   #0
                       00    DD   02F2                        PUSHL   #0
```

```
                 00000008'EF   7F  02F4                          PUSHAQ  L_PAGESTRT
            00010430'GF   05   FB  02FA                          CALLS   #5,G^SYS$SETPRT
                                   0301   828          $DS_BCOMPLETE   7$
                       1A 50   E8  0301                          BLBS    R0, 7$
                                   0304   829          $DS_ERRSYS_S    UNIT=#0,MSGADR=T_PAGEPROT
                          00   DD  0304                          PUSHL   #0
                 00000844'EF   DF  0306                          PUSHAL  T_PAGEPROT
                          00   DD  030C                          PUSHL   #0
                          03   DD  030E                          PUSHL   #$ER
                                   0310       ;;; TEST 4, SUBTEST 2, ERROR 3
            000100C0 9F   04   FB  0310                          CALLS   #$$M, @#DS$ERRSYS
                                   0317   830          $DS_ABORT
            00010020 9F   6C   FA  0317                          CALLG   (AP), @#DS$ABORT
                                   031E   831
00000000'EF  0000001C'EF   04   C3  031E   832 7$:     SUBL3   #4,L_ADDRESS,L_EXP_SP   ; load expected SP
     00000000'EF  00000000'EF   D0  032A   833          MOVL    L_KSP,L_EXP_KSP         ; load expected KSP
                  00000000'EF   D4  0335   834          CLRL    L_EXP_ISP               ; ISP unpredictable if on int. stack
     00000000'EF  00000983'EF   D0  033B   835          MOVL    DATA_2,L_EXP_PSL        ; load expected PSL
                                   0346   836
                  00000C42'EF   16  0346   837          JSB     LOAD_GPR                ; load GPR's with data and read AP, FP
            0000003C'EF   01   C8  034C   838          BISL2   #M_READY,L_FLAGS        ; set ready to execute flag
            5E   0000001C'EF   D0  0353   839          MOVL    L_ADDRESS,SP            ; point IS SP to that address
                                01  035A   840          NOP                             ; wait a little
                                FC  035B   841 8$:     XFC                             ; execute XFC instruction to cause
                                   035C   842                                          ; exception which will attempt to push
                                   035C   843                                          ; on an invalid IS, renter at RENTRY2
                                   035C   844
            0000003C'EF   04   C8  035C   845          BISL2   #M_EXECUTE_ERR,L_FLAGS  ; set flag, XFC did not work properly
                                   0363   846
                                   0363   847 RENTRY3:
                                   0363   848
         11 00000000'EF   1A   E1  0363   849          BBC     #PSL$V_IS,L_ACT_PSL,10$ ; br = not on IS as expected
            5E   00000020'EF   D0  036B   850          MOVL    L_CUR_ISP,SP            ; reset IS SP
            6E   0000037A'8F   D0  0372   851          MOVL    #9$,(SP)                ; setup return address
                                02  0379   852          REI                             ; get off interrupt stack
     00000000'8F  00000020'EF   DA  037C   854 10$:    MTPR    L_CUR_ISP,#PR$_ISP      ; load IS SP into IPR
                  00000CE5'EF   16  0387   855 11$:    JSB     ERROR_CHECK             ; check for errors (GPR's,AP,FP,PSL)
         20 0000003C'EF   0C   E1  038D   856          BBC     #V_ERROR_FLAG,L_FLAGS,12$ ; br = no errors
                                   0395   857          $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_INVLDIS_ERR
                  00000315'8F   DD  0395                          PUSHL   #T_INVLDIS_ERR
                  0000099B'EF   DF  039B                          PUSHAL  ERR_MESSAGE
                          00   DD  03A1                          PUSHL   #0
                          00   DD  03A3                          PUSHL   #0
                          04   DD  03A5                          PUSHL   #$ER
                                   03A7       ;;; TEST 4, SUBTEST 2, ERROR 4
            000100D0 9F   05   FB  03A7                          CALLS   #$$M, @#DS$ERRHARD
                                   03AE   858          $DS_ABORT
            00010020 9F   6C   FA  03AE                          CALLG   (AP), @#DS$ABORT
         07 0000003C'EF   08   E1  03B5   859 12$:    BBC     #V_FATAL_ERR,L_FLAGS,13$ ; br = no fatal errors
                                   03BD   860          $DS_ABORT
            00010020 9F   6C   FA  03BD                          CALLG   (AP), @#DS$ABORT
                                   03C4   861 13$:    $SETPRT_S INADR=L_PAGESTRT,PROT=#PRT$C_KW,PRVPRT=L_OLDPROT
                  0000002C'EF   9F  03C4                          PUSHAB  L_OLDPROT
                  00000000'8F   DD  03CA                          PUSHL   #PRT$C_KW
```

```
                        00    DD  03D0                        PUSHL   #0
                        00    DD  03D2                        PUSHL   #0
              00000008'EF     7F  03D4                        PUSHAQ  L_PAGESTRT
          00010430'GF   05    FB  03DA                        CALLS   #5,G^SYS$SETPRT
                              03E1    862         $DS_BCOMPLETE   14$
                     1A 50    E8  03E1                        BLBS    R0, 14$
                              03E4    863         $DS_ERRSYS_S    UNIT=#0,MSGADR=T_PAGEPROT
                        00    DD  03E4                        PUSHL   #0
              00000844'EF     DF  03E6                        PUSHAL  T_PAGEPROT
                        00    DD  03EC                        PUSHL   #0
                        05    DD  03EE                        PUSHL   #$ER
                              03F0        ;;; TEST 4, SUBTEST 2, ERROR 5
          000100C0 9F   04    FB  03F0                        CALLS   #$$M, a#DS$ERRSYS
                              03F7    864         $DS_ABORT
          00010020 9F   6C    FA  03F7                        CALLG   (AP), a#DS$ABORT
                              03FE    865 14$:    $DS_MMOFF_S                     ; turn memory management off
          00010158 9F   00    FB  03FE                        CALLS   #0, a#DS$MMOFF
                              0405    866         $DS_CLRVEC_S    VECTOR=#SCB$L_OPCCUS
                        14    DD  0405                        PUSHL   #SCB$L_OPCCUS
          00010168 9F   01    FB  0407                        CALLS   #1, a#DS$CLRVEC
                              040E    867         $DS_ENDSUB
                              040E        T4_S2_X:
    00010038 9F   0000000C'EF   FA  040E                        CALLG   $S$, a#DS$ENDSUB
                              0419    868         $DS_PAGE
```

```
0419                    .SBTTL  SUBTEST 4.3:  IS SP points to NXM
0419    871 ;+
0419    872 ; Subtest description:
0419    873 ;
0419    874 ;       This subtest checks that an interrupt stack, stack pointer which
0419    875 ;       points to nonexistent memory will halt the processor. Memory
0419    876 ;       management is off for this subtest and an Interrupt Stack not valid
0419    877 ;       HALT should occur (code = 4).
0419    878 ;
0419    879 ; Subtest steps:
0419    880 ;
0419    881 ;       SUBTEST IS points to NXM
0419    882 ;       :  Initialize Flags
0419    883 ;       :  Clear RPB from location 0 in memory
0419    884 ;       :  Setup code to set done flag at loc 100
0419    885 ;       :  Save current IS SP
0419    886 ;       :  Setup a jump to RENTRY point at next loc
0419    887 ;       :  Get XFC vector to handle on interrupt stack
0419    888 ;       :  Execute XFC instruction
0419    889 ;       :  IF not on the interrupt stack
0419    890 ;       :  :  THEN
0419    891 ;       :  :  Report system error
0419    892 ;       :  :  Abort program
0419    893 ;       :  ENDIF
0419    894 ;       :  Release XFC vector
0419    895 ;       :  Get XFC vector for service on the interrupt stack
0419    896 ;       :  IF operator present
0419    897 ;       :  :  THEN
0419    898 ;       :  :  Print instructions to operator
0419    899 ;       :  ENDIF
0419    900 ;       :  IF operator NOT present
0419    901 ;       :  :  THEN
0419    902 ;       :  :  Setup RPB at loc 0 pointing to loc 100
0419    903 ;       :  ENDIF
0419    904 ;       :  Point interrupt stack pointer to NXM
0419    905 ;       :  Setup all expected data
0419    906 ;       :  Load GPR's with data
0419    907 ;       :  Set ready to execute flag
0419    908 ;       :  Execute XFC to cause exception which will write PC and PSL on IS
0419    909 ;       :  (this should cause an interrupt stack not valid HALT)
0419    910 ;       :  IF XFC not executed (will continue in line execution and get here)
0419    911 ;       :  :  THEN
0419    912 ;       :  :  Set XFC execution error flag
0419    913 ;       :  ENDIF
0419    914 ;       :  RENTRY point (restart will enter here)
0419    915 ;       :  Read PSL
0419    916 ;       :  IF on IS stack as expected
0419    917 ;       :  :  THEN
0419    918 ;       :  :  Restore IS SP
0419    919 ;       :  ENDIF
0419    920 ;       :  Go check FLAGS, PSL, KSP, ISP, SP and GPR's for errors
0419    921 ;       :  IF any errors
0419    922 ;       :  :  THEN
0419    923 ;       :  :  Report errors
0419    924 ;       :  ENDIF
```

```
                                0419   925 ;       :  IF fatal error
                                0419   926 ;       :  :  THEN
                                0419   927 ;       :  :  Abort test
                                0419   928 ;       :  ENDIF
                                0419   929 ;       :  Release XFC vector
                                0419   930 ;       ENDSUBTEST IS points to NXM
                                0419   931 ;
                                0419   932 ;-
                                0419   933
                                0419   934         $DS_BGNSUB
                                0419       T4_S3::
00010030 9F   00000018'EF   FA  0419                 CALLG   $S$, a#DS$BGNSUB
              00000BF8'EF   16  0424   935          JSB     CLEAR_RPB                ; disable restart parameter block
              00000C2A'EF   16  042A   936          JSB     CLEAR_BUFFER             ; clear data buffers
              0000003C'EF   D4  0430   937          CLRL    L_FLAGS                  ; initialize flags
                            0436   938          $DS_MMON_S
        00010150 9F   00    FB  0436                 CALLS   #0, a#DS$MMON
                            043D   939          $DS_SETVEC_S    VECTOR=#SCB$L_OPCCUS,SRVADR=RENTRY4,CODE=#1
                      01    DD  043D                 PUSHL   #1
                00000450'EF   DF  043F                 PUSHAL  RENTRY4
                      14    DD  0445                 PUSHL   #SCB$L_OPCCUS
        00010160 9F   03    FB  0447                 CALLS   #3, a#DS$SETVEC
                            FC  044E   940 1$:       XFC                              ; get onto the IS
                                044F   941          .ALIGN  LONG
                                0450   942 RENTRY4:
                00000000'EF   DC  0450   943          MOVPSL  L_ACT_PSL
     1A 00000000'EF   1A    E0  0456   944          BBS     #PSL$V_IS,L_ACT_PSL,2$
                                045E   945          $DS_ERRHARD_S   UNIT=#0,MSGADR=T_NOT_ON_IS
                      00    DD  045E                 PUSHL   #0
                0000089B'EF   DF  0460                 PUSHAL  T_NOT_ON_IS
                      00    DD  0466                 PUSHL   #0
                      01    DD  0468                 PUSHL   #$ER
                                046A       ;;; TEST 4, SUBTEST 3, ERROR 1
        000100D0 9F   04    FB  046A                 CALLS   #$$M, a#DS$ERRHARD
                                0471   946          $DS_ABORT
        00010020 9F   6C    FA  0471                 CALLG   (AP), a#DS$ABORT
                                0478   947 2$:       $DS_CLRVEC_S    VECTOR=#SCB$L_OPCCUS
                      14    DD  0478                 PUSHL   #SCB$L_OPCCUS
        00010168 9F   01    FB  047A                 CALLS   #1, a#DS$CLRVEC
                                0481   948
                                0481   949          $DS_SETVEC_S    VECTOR=#SCB$L_OPCCUS,SRVADR=XFC_SERVICE,CODE=#1
                      01    DD  0481                 PUSHL   #1
                00000CD8'EF   DF  0483                 PUSHAL  XFC_SERVICE
                      14    DD  0489                 PUSHL   #SCB$L_OPCCUS
        00010160 9F   03    FB  048B                 CALLS   #3, a#DS$SETVEC
00000100'EF   00000040'EF   7D  0492   950 3$:       MOVQ    JUMP,RESTART             ; setup code to renter after halt
00000108'EF   00000048'EF   7D  049D   951          MOVQ    JUMP+8,RESTART+8         ; load rest of rentry code
00000004'EF   00000530'EF   DE  04A8   952          MOVAL   RENTRY5,RENTRY_POINT     ; load rentry address
        00000020'EF   5E    D0  04B3   953          MOVL    SP,L_CUR_ISP             ; read the current IS SP
     08 0000FE00'EF   0C    E0  04BA   954          BBS     #DSA$V_OPER,DSA$GL_FLAGS,4$ ; br = operator present, manual test
              00000C00'EF   16  04C2   955          JSB     SETUP_RPB                ; no operator, use auto restart
                      22    11  04C8   956          BRB     5$                       ; skip over message
                                04CA   957 4$:       $DS_PRINTF_S    FORMAT=T_INSTRUCTIONS,P0=#6$,P1=#CODE_04
                      04    DD  04CA                 PUSHL   #CODE_04
                00000528'8F   DD  04CC                 PUSHL   #6$
```

```
                000001DC'EF   9F   04D2                      PUSHAB  T_INSTRUCTIONS
            000100F0 9F       03   FB   04D8                 CALLS   #$$N, a#DS$PRINTF
                                   04DF   958        $DS_PRINTF_S    FORMAT=T_CONTINUE
                00000212'EF   9F   04DF                      PUSHAB  T_CONTINUE
            000100F0 9F       01   FB   04E5                 CALLS   #$$N, a#DS$PRINTF
    00000000'EF   FFFFFFF8 8F   D0   04EC   959 5$:     MOVL    #-8,L_EXP_SP            ; load expected SP
    00000000'EF   00000000'EF   D0   04F7   960         MOVL    L_KSP,L_EXP_KSP         ; load expected KSP
                00000000'EF   D4   0502   961         CLRL    L_EXP_ISP               ; ISP unpredictable if on int. stack
    00000000'EF   00000987'EF   D0   0508   962         MOVL    DATA_3,L_EXP_PSL        ; load expected PSL
                00000C42'EF   16   0513   963         JSB     LOAD_GPR                ; load GPR'S and read AP & FP
            5E  FFFFFFFC 8F   D0   0519   964         MOVL    #-4,SP                  ; point IS sp to a NXM address
            0000003C'EF   01   C8   0520   965         BISL2   #M_READY,L_FLAGS        ; set ready to execute flag
                                   0527   966         NOP                             ; wait a little
                                   0528   967 6$:     XFC                             ; execute XFC instruction to cause
                                   0529   968                                         ; exception which will push on IS
                                   0529   969                                         ; and cause a not valid halt
            0000003C'EF   04   C8   0529   970         BISL2   #M_EXECUTE_ERR,L_FLAGS  ; if no exception occurs will get here
                                   0530   971
                                   0530   972 RENTRY5:                               ; will renter here when completed
                                   0530   973
         11 00000000'EF   1A   E1   0530   974         BBC     #PSL$V_IS,L_ACT_PSL,8$  ; br = not on IS as expected
            5E  00000020'EF   D0   0538   975         MOVL    L_CUR_ISP,SP            ; reset IS SP
            6E  00000547'8F   D0   053F   976         MOVL    #7$,(SP)                ; setup return address
                                   02   0546   977         REI                             ; get off interrupt stack
    00000000'8F   00000020'EF   DA   0549   979 8$:     MTPR    L_CUR_ISP,#PR$_ISP      ; load IS SP into IPR
                00000CE5'EF   16   0554   981 9$:     JSB     ERROR_CHECK             ; check for errors (GPR's,AP,FP,PSL)
          28 0000003C'EF   0C   E1   055A   982         BBC     #V_ERROR_FLAG,L_FLAGS,10$ ; br = no errors
                00000350'8F   DD   0562                      PUSHL   #T_NXMIS_ERR
                0000099B'EF   DF   0568                      PUSHAL  ERR_MESSAGE
                           00   DD   056E                      PUSHL   #0
                           00   DD   0570                      PUSHL   #0
                           02   DD   0572                      PUSHL   #$ER
                                   0574           ;;; TEST 4, SUBTEST 3, ERROR 2
            000100D0 9F       05   FB   0574                 CALLS   #$$M, a#DS$ERRHARD
          07 0000003C'EF   08   E1   057B   984         BBC     #V_FATAL_ERR,L_FLAGS,10$ ; br = no fatal errors
                                   0583   985         $DS_ABORT
            00010020 9F       6C   FA   0583                 CALLG   (AP), a#DS$ABORT
                                   058A   986 10$:     $DS_MMOFF_S
            00010158 9F       00   FB   058A                 CALLS   #0, a#DS$MMOFF
                                   0591   987         $DS_CLRVEC_S    VECTOR=#SCB$L_OPCCUS
                           14   DD   0591                      PUSHL   #SCB$L_OPCCUS
            00010168 9F       01   FB   0593                 CALLS   #1, a#DS$CLRVEC
                                   059A   988         $DS_ENDSUB
                                   059A               T4_S3_X:
    00010038 9F   00000018'EF   FA   059A                      CALLG   $S$, a#DS$ENDSUB
                                   05A5   989         $DS_PAGE
```

```
05A5                    .SBTTL  SUBTEST 4.4:  CHMU instruction with PSL<IS>=1
05A5     992 ;+
05A5     993 ; Subtest description:
05A5     994 ;
05A5     995 ;       This subtest checks that a CHMU instruction with PSL<IS>=1, will cause
05A5     996 ;       the processor to HALT (code = A).
05A5     997 ;
05A5     998 ; Subtest steps:
05A5     999 ;
05A5    1000 ;       SUBTEST CHMU instruction with PSL<IS>=1
05A5    1001 ;       :  Initialize Flags
05A5    1002 ;       :  Clear RPB from location 0 in memory
05A5    1003 ;       :  Get XFC vector to handle exception on interrupt stack
05A5    1004 ;       :  Get CHMU vector in case CHMU instruction does execute
05A5    1005 ;       :  Setup code to set done flag at loc 100
05A5    1006 ;       :  Setup code to jump to READ_GPR point in next loc
05A5    1007 ;       :  IF operator present
05A5    1008 ;       :  :  THEN
05A5    1009 ;       :  :  Print restart instructions to operator
05A5    1010 ;       :  ENDIF
05A5    1011 ;       :  IF operator NOT present
05A5    1012 ;       :  :  THEN
05A5    1013 ;       :  :  Setup RPB at loc 0 pointing to loc 100
05A5    1014 ;       :  ENDIF
05A5    1015 ;       :  Execute an XFC instruction to get on interrupt stack
05A5    1016 ;       :  Read current PSL
05A5    1017 ;       :  IF NOT on interrupt stack
05A5    1018 ;       :  :  THEN
05A5    1019 ;       :  :  Report wrong stack error
05A5    1020 ;       :  :  Abort test
05A5    1021 ;       :  ENDIF
05A5    1022 ;       :  Setup all expected data
05A5    1023 ;       :  Load GPR's with data
05A5    1024 ;       :  Set ready to execute flag
05A5    1025 ;       :  Execute CHMU to cause processor to HALT
05A5    1026 ;       :  (this should cause a CHMU on interrupt stack HALT)
05A5    1027 ;       :  IF CHMU does not caues an exception
05A5    1028 ;       :  :  THEN
05A5    1029 ;       :  :  Set execution error flag
05A5    1030 ;       :  ENDIF
05A5    1031 ;       :  RENTRY point (restart enters here from exception)
05A5    1032 ;       :  Go check FLAGS, PSL, KSP, ISP, SP and GPR's for errors
05A5    1033 ;       :  IF any errors
05A5    1034 ;       :  :  THEN
05A5    1035 ;       :  :  Report errors
05A5    1036 ;       :  ENDIF
05A5    1037 ;       :  IF fatal error
05A5    1038 ;       :  :  THEN
05A5    1039 ;       :  :  Abort test
05A5    1040 ;       :  ENDIF
05A5    1041 ;       :  Modify PC on stack to point to second RENTRY point
05A5    1042 ;       :  Execute REI to get back to correct stack
05A5    1043 ;       :  Second RENTRY point
05A5    1044 ;       :  Read PSL
05A5    1045 ;       :  IF not on kernel stack
```

```
                                05A5  1046 ;       :  : THEN
                                05A5  1047 ;       :  : Report incorrect stack error
                                05A5  1048 ;       :  : Abort test
                                05A5  1049 ;       :  ENDIF
                                05A5  1050 ;       :  Release interval timer vector
                                05A5  1051 ;       :  Release CHMU vector
                                05A5  1052 ;       :  Release XFC vector
                                05A5  1053 ;       ENDSUBTEST CHMU instruction with PSL<IS>=1
                                05A5  1054 ;
                                05A5  1055 ;-
                                05A5  1056
                                05A5  1057         $DS_BGNSUB
                                05A5       T4_S4::
00010030 9F   00000024'EF   FA  05A5                   CALLG   $S$, a#DS$BGNSUB
              00000BF8'EF   16  05B0  1058         JSB     CLEAR_RPB              ; disable restart parameter block
              00000C2A'EF   16  05B6  1059         JSB     CLEAR_BUFFER           ; clear data buffers
              0000003C'EF   D4  05BC  1060         CLRL    L_FLAGS                ; initialize flags
                                05C2  1061         $DS_SETVEC_S    VECTOR=#SCB$L_OPCCUS,SRVADR=RENTRY6,CODE=#1
                         01   DD  05C2                   PUSHL   #1
                 000005EC'EF   DF  05C4                   PUSHAL  RENTRY6
                         14   DD  05CA                   PUSHL   #SCB$L_OPCCUS
           00010160 9F   03   FB  05CC                   CALLS   #3, a#DS$SETVEC
                                05D3  1062 1$:     $DS_SETVEC_S    VECTOR=#SCB$L_CHMU,SRVADR=CHMX_SERVICE
                         00   DD  05D3                   PUSHL   #0
                 00000CC4'EF   DF  05D5                   PUSHAL  CHMX_SERVICE
                 0000004C 8F   DD  05DB                   PUSHL   #SCB$L_CHMU
           00010160 9F   03   FB  05E1                   CALLS   #3, a#DS$SETVEC
                                05E8  1063
                                FC  05E8  1064 2$:     XFC                            ; execute XFC instruction to cause
                                05E9  1065                                            ; exception which will get on IS
                                05E9  1066         .ALIGN  LONG
                                05EC  1067 RENTRY6:
                 00000000'EF   DC  05EC  1068         MOVPSL  L_ACT_PSL              ; read PSL
        1A 00000000'EF   1A   E0  05F2  1069         BBS     #PSL$V_IS,L_ACT_PSL,3$ ; br = on interrupt stack
                                05FA  1070         $DS_ERRHARD_S   UNIT=#0,MSGADR=T_NOT_ON_IS
                         00   DD  05FA                   PUSHL   #0
                 0000089B'EF   DF  05FC                   PUSHAL  T_NOT_ON_IS
                         00   DD  0602                   PUSHL   #0
                         01   DD  0604                   PUSHL   #$ER
                              0606       ;;; TEST 4, SUBTEST 4, ERROR 1
           000100D0 9F   04   FB  0606                   CALLS   #$$M, a#DS$ERRHARD
                                060D  1071         $DS_ABORT
           00010020 9F   6C   FA  060D                   CALLG   (AP), a#DS$ABORT
00000100'EF    00000040'EF   7D  0614  1072 3$:     MOVQ    JUMP,RESTART           ; setup code to renter after halt
00000108'EF    00000048'EF   7D  061F  1073         MOVQ    JUMP+8,RESTART+8       ; load rest of rentry code
00000004'EF    000006AD'EF   DE  062A  1074         MOVAL   RENTRY7,RENTRY_POINT   ; load rentry address
      08 0000FE00'EF   0C   E0  0635  1075         BBS     #DSA$V_OPER,DSA$GL_FLAGS,4$ ; br = operator present
                 00000C00'EF   16  063D  1076         JSB     SETUP_RPB              ; no operator, use auto restart
                         22   11  0643  1077         BRB     5$                     ; skip over message
                              0645  1078 4$:     $DS_PRINTF_S    FORMAT=T_INSTRUCTIONS,P0=#6$,P1=#CODE_0A
                         0A   DD  0645                   PUSHL   #CODE_0A
                 000006A4'8F   DD  0647                   PUSHL   #6$
                 000001DC'EF   9F  064D                   PUSHAB  T_INSTRUCTIONS
           000100F0 9F   03   FB  0653                   CALLS   #$$N, a#DS$PRINTF
                              065A  1079         $DS_PRINTF_S    FORMAT=T_CONTINUE
```

```
                  00000212'EF   9F  065A                          PUSHAB  T_CONTINUE
              000100F0 9F   01   FB  0660                          CALLS   #$$N, @#DS$PRINTF
              00000020'EF   5E   D0  0667  1080 5$:      MOVL    SP,L_CUR_ISP
00000000'EF   00000000'EF   08   C3  066E  1081          SUBL3   #8,L_ISP,L_EXP_SP        ; load expected SP
     00000000'EF   00000000'EF   D0  067A  1082          MOVL    L_KSP,L_EXP_KSP          ; load expected KSP
              00000000'EF   00   D0  0685  1083          MOVL    #0,L_EXP_ISP             ; ISP unpredictable if on int. stack
     00000000'EF   0000098B'EF   D0  068C  1084          MOVL    DATA_4,L_EXP_PSL         ; load expected PSL
                  00000C42'EF   16  0697  1085          JSB     LOAD_GPR                 ; load GPR's with data
              0000003C'EF   01   C8  069D  1086          BISL2   #M_READY,L_FLAGS         ; set ready to execute flag
                            00   BF  06A4  1087 6$:      CHMU    #0                       ; execute change mode instruction
              0000003C'EF   04   C8  06A6  1088          BISL2   #M_EXECUTE_ERR,L_FLAGS   ; if no exception occurs will get here
                                     06AD  1089 RENTRY7:                                   ; will renter here when completed
          11 00000000'EF   1A   E1  06AD  1090          BBC     #PSL$V_IS,L_ACT_PSL,8$   ; br = not on IS as expected
              5E   00000020'EF   D0  06B5  1091          MOVL    L_CUR_ISP,SP             ; reset IS SP
              6E   000006C4'8F   D0  06BC  1092          MOVL    #7$,(SP)                 ; setup return address
                                 02  06C3  1093          REI                              ; get off interrupt stack
                            0B   11  06C4  1094 7$:      BRB     9$                       ; skip IPR load
     00000000'8F   00000020'EF   DA  06C6  1095 8$:      MTPR    L_CUR_ISP,#PR$_ISP       ; load IS SP into IPR
                  00000CE5'EF   16  06D1  1096 9$:      JSB     ERROR_CHECK              ; check for errors (GPR's,AP,FP,PSL)
          28 0000003C'EF   0C   E1  06D7  1097          BBC     #V_ERROR_FLAG,L_FLAGS,10$ ; br = no errors
                                     06DF  1098          $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_CHMU_ERR
                  0000038D'8F   DD  06DF                          PUSHL   #T_CHMU_ERR
                  0000099B'EF   DF  06E5                          PUSHAL  ERR_MESSAGE
                            00   DD  06EB                          PUSHL   #0
                            00   DD  06ED                          PUSHL   #0
                            02   DD  06EF                          PUSHL   #$ER
                                     06F1        ;;; TEST 4, SUBTEST 4, ERROR 2
              000100D0 9F   05   FB  06F1                          CALLS   #$$M, @#DS$ERRHARD
          07 0000003C'EF   08   E1  06F8  1099          BBC     #V_FATAL_ERR,L_FLAGS,10$ ; br = no fatal errors
                                     0700  1100          $DS_ABORT
              00010020 9F   6C   FA  0700                          CALLG   (AP), @#DS$ABORT
                                     0707  1101 10$:     $DS_CLRVEC_S    VECTOR=#SCB$L_OPCCUS
                            14   DD  0707                          PUSHL   #SCB$L_OPCCUS
              00010168 9F   01   FB  0709                          CALLS   #1, @#DS$CLRVEC
                                     0710  1102          $DS_CLRVEC_S    VECTOR=#SCB$L_CHMU
                  0000004C 8F   DD  0710                          PUSHL   #SCB$L_CHMU
              00010168 9F   01   FB  0716                          CALLS   #1, @#DS$CLRVEC
                                     071D  1103          $DS_ENDSUB
                                     071D        T4_S4_X:
     00010038 9F   00000024'EF   FA  071D                          CALLG   $S$, @#DS$ENDSUB
                                     0728  1104          $DS_PAGE
                                     0728  1105
```

```
                        .SBTTL  SUBTEST 4.5:  CHMS instruction with PSL<IS>=1
                1108 ;+
                1109 ; Subtest description:
                1110 ;
                1111 ;       This subtest checks that a CHMS instruction with PSL<IS>=1, will cause
                1112 ;       the processor to HALT (code = A).
                1113 ;
                1114 ; Subtest steps:
                1115 ;
                1116 ;       SUBTEST CHMS instruction with PSL<IS>=1
                1117 ;       :  Initialize Flags
                1118 ;       :  Clear RPB from location 0 in memory
                1119 ;       :  Get XFC vector to handle exception on interrupt stack
                1120 ;       :  Get interval timer vector to prevent outside interrupts
                1121 ;       :  Get CHMS vector in case CHMS instruction does execute
                1122 ;       :  Setup code to set done flag at loc 100
                1123 ;       :  Setup code to jump to RENTRY point in next loc
                1124 ;       :  IF operator present
                1125 ;       :  :  THEN
                1126 ;       :  :  Print restart instructions to operator
                1127 ;       :  ENDIF
                1128 ;       :  IF operator NOT present
                1129 ;       :  :  THEN
                1130 ;       :  :  Setup RPB at loc 0 pointing to loc 100
                1131 ;       :  ENDIF
                1132 ;       :  Execute an XFC instruction to get on interrupt stack
                1133 ;       :  Read current PSL
                1134 ;       :  IF NOT on interrupt stack
                1135 ;       :  :  THEN
                1136 ;       :  :  Report wrong stack error
                1137 ;       :  :  Exit test
                1138 ;       :  ENDIF
                1139 ;       :  Set ready to execute flag
                1140 ;       :  Execute CHMS to cause processor to HALT
                1141 ;       :  (this should cause a CHMS on interrupt stack HALT)
                1142 ;       :  IF CHMS does not caues an exception
                1143 ;       :  :  THEN
                1144 ;       :  :  Set execption error flag
                1145 ;       :  ENDIF
                1146 ;       :  RENTRY point (restart enters here from exception)
                1147 ;       :  IF execption error flag set
                1148 ;       :  :  THEN
                1149 ;       :  :  Report CHMS execption error
                1150 ;       :  :  Exit test
                1151 ;       :  ENDIF
                1152 ;       :  IF CHMS instruction executed flag set
                1153 ;       :  :  THEN
                1154 ;       :  :  Report change mode error
                1155 ;       :  :  Exit test
                1156 ;       :  ENDIF
                1157 ;       :  IF done flag not set
                1158 ;       :  :  THEN
                1159 ;       :  :  Report done error
                1160 ;       :  :  Exit test
                1161 ;       :  ENDIF
```

```
                                0728  1162 ;       :  Modify PC on stack to point to RENTRY2
                                0728  1163 ;       :  Execute REI to get back to correct stack
                                0728  1164 ;       :  RENTRY2 point
                                0728  1165 ;       :  Read PSL
                                0728  1166 ;       :  IF IS not clear
                                0728  1167 ;       :  :  THEN
                                0728  1168 ;       :  :  Report incorrect stack error in clean up
                                0728  1169 ;       :  :  Exit test
                                0728  1170 ;       :  ENDIF
                                0728  1171 ;       :  Release interval timer vector
                                0728  1172 ;       :  Release CHMS vector
                                0728  1173 ;       :  Release XFC vector
                                0728  1174 ;       ENDSUBTEST CHMS instruction with PSL<IS>=1
                                0728  1175 ;
                                0728  1176 ;-
                                0728  1177        $DS_BGNSUB
                                0728       T4_S5::
    00010030 9F   00000030'EF   FA  0728                CALLG   $S$, a#DS$BGNSUB
                  00000BF8'EF   16  0733  1178          JSB     CLEAR_RPB               ; disable restart parameter block
                  00000C2A'EF   16  0739  1179          JSB     CLEAR_BUFFER            ; clear data buffers
                  0000003C'EF   D4  073F  1180          CLRL    L_FLAGS                 ; initialize flags
                                0745  1181          $DS_SETVEC_S    VECTOR=#SCB$L_OPCCUS,SRVADR=RENTRY8,CODE=#1
                          01    DD  0745                PUSHL   #1
                  0000076C'EF   DF  0747                PUSHAL  RENTRY8
                          14    DD  074D                PUSHL   #SCB$L_OPCCUS
              00010160 9F   03  FB  074F                CALLS   #3, a#DS$SETVEC
                                0756  1182 1$:     $DS_SETVEC_S    VECTOR=#SCB$L_CHMS,SRVADR=CHMX_SERVICE
                          00    DD  0756                PUSHL   #0
                  00000CC4'EF   DF  0758                PUSHAL  CHMX_SERVICE
                  00000048 8F   DD  075E                PUSHL   #SCB$L_CHMS
              00010160 9F   03  FB  0764                CALLS   #3, a#DS$SETVEC
                                0769  1183
                                FC  0769  1184 2$:      XFC                             ; execute XFC instruction to cause
                                076A  1185                                              ; exception which will get on IS
                                076A  1186          .ALIGN  LONG
                                076A  1187 RENTRY8:
                  00000000'EF   DC  076A  1188          MOVPSL  L_ACT_PSL               ; read PSL
            1A 00000000'EF   1A  E0  0770  1189          BBS     #PSL$V_IS,L_ACT_PSL,3$  ; br = on interrupt stack
                                0778  1190          $DS_ERRHARD_S   UNIT=#0,MSGADR=T_NOT_ON_IS
                          00    DD  0778                PUSHL   #0
                  0000089B'EF   DF  077A                PUSHAL  T_NOT_ON_IS
                          00    DD  0780                PUSHL   #0
                          01    DD  0782                PUSHL   #$ER
                                0784       ;;; TEST 4, SUBTEST 5, ERROR 1
              000100D0 9F   04  FB  0784                CALLS   #$$M, a#DS$ERRHARD
                                078B  1191          $DS_ABORT
              00010020 9F   6C  FA  078B                CALLG   (AP), a#DS$ABORT
    00000100'EF   00000040'EF   7D  0792  1192 3$:     MOVQ    JUMP,RESTART            ; setup code to renter after halt
    00000108'EF   00000048'EF   7D  079D  1193          MOVQ    JUMP+8,RESTART+8        ; load rest of rentry code
    00000004'EF   0000082D'EF   DE  07A8  1194          MOVAL   RENTRY9,RENTRY_POINT    ; load rentry address
          08 0000FE00'EF   0C  E0  07B3  1195          BBS     #DSA$V_OPER,DSA$GL_FLAGS,4$ ; br = operator present
                  00000C00'EF   16  07BB  1196          JSB     SETUP_RPB               ; no operator, use auto restart
                          22    11  07C1  1197          BRB     5$                      ; skip over message
                                07C3  1198 4$:      $DS_PRINTF_S    FORMAT=T_INSTRUCTIONS,P0=#6$,P1=#CODE_0A
                          0A    DD  07C3                PUSHL   #CODE_0A
```

```
                00000824'8F    DD  07C7                        PUSHL   #6$
                000001DC'EF    9F  07CD                        PUSHAB  T_INSTRUCTIONS
            000100F0 9F    03  FB  07D3                        CALLS   #$$N, a#DS$PRINTF
                                   07DA  1199          $DS_PRINTF_S    FORMAT=T_CONTINUE
                00000212'EF    9F  07DA                        PUSHAB  T_CONTINUE
            000100F0 9F    01  FB  07E0                        CALLS   #$$N, a#DS$PRINTF
            00000020'EF    5E  D0  07E7  1200 5$:      MOVL    SP,L_CUR_ISP
00000000'EF 00000000'EF    08  C3  07EE  1201          SUBL3   #8,L_ISP,L_EXP_SP       ; load expected SP
     00000000'EF    00000000'EF  D0  07FA  1202          MOVL    L_KSP,L_EXP_KSP         ; load expected KSP
            00000000'EF    00  D0  0805  1203          MOVL    #0,L_EXP_ISP            ; ISP unpredictable if on int. stack
     00000000'EF    0000098B'EF  D0  080C  1204          MOVL    DATA_4,L_EXP_PSL        ; load expected PSL
            00000C42'EF    16  0817  1205          JSB     LOAD_GPR                ; load GPR's with data
            0000003C'EF    01  C8  081D  1206          BISL2   #M_READY,L_FLAGS        ; set ready to execute flag
                           00  BE  0824  1207 6$:      CHMS    #0                      ; execute change mode instruction
            0000003C'EF    04  C8  0826  1208          BISL2   #M_EXECUTE_ERR,L_FLAGS  ; if no exception occurs will get here
                                   082D  1209 RENTRY9:                                ; will renter here when completed
         11 00000000'EF    1A  E1  082D  1210          BBC     #PSL$V_IS,L_ACT_PSL,8$  ; br = not on IS as expected
            5E  00000020'EF    D0  0835  1211          MOVL    L_CUR_ISP,SP            ; reset IS SP
            6E  00000844'8F    D0  083C  1212          MOVL    #7$,(SP)                ; setup return address
                           02  11  0843  1213          REI                             ; get off interrupt stack
                           0B  11  0844  1214 7$:      BRB     9$                      ; skip IPR load
     00000000'8F    00000020'EF  DA  0846  1215 8$:      MTPR    L_CUR_ISP,#PR$_ISP      ; load IS SP into IPR
            00000CE5'EF    16  0851  1216 9$:      JSB     ERROR_CHECK             ; check for errors (GPR's,AP,FP,PSL)
         28 0000003C'EF    0C  E1  0857  1217          BBC     #V_ERROR_FLAG,L_FLAGS,10$ ; br = no errors
                                   085F  1218          $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_CHMS_ERR
                000003B5'8F    DD  085F                        PUSHL   #T_CHMS_ERR
                0000099B'EF    DF  0865                        PUSHAL  ERR_MESSAGE
                           00  DD  086B                        PUSHL   #0
                           00  DD  086D                        PUSHL   #0
                           02  DD  086F                        PUSHL   #$ER
                                   0871        ;;; TEST 4, SUBTEST 5, ERROR 2
            000100D0 9F    05  FB  0871                        CALLS   #$$M, a#DS$ERRHARD
         07 0000003C'EF    08  E1  0878  1219          BBC     #V_FATAL_ERR,L_FLAGS,10$ ; br = no fatal errors
                                   0880  1220          $DS_ABORT
            00010020 9F    6C  FA  0880                        CALLG   (AP), a#DS$ABORT
                                   0887  1221 10$:     $DS_CLRVEC_S    VECTOR=#SCB$L_OPCCUS
                           14  DD  0887                        PUSHL   #SCB$L_OPCCUS
            00010168 9F    01  FB  0889                        CALLS   #1, a#DS$CLRVEC
                                   0890  1222          $DS_CLRVEC_S    VECTOR=#SCB$L_CHMS
                 00000048 8F    DD  0890                        PUSHL   #SCB$L_CHMS
            00010168 9F    01  FB  0896                        CALLS   #1, a#DS$CLRVEC
                                   089D  1223          $DS_ENDSUB
                                   089D        T4_S5_X:
00010038 9F    00000030'EF    FA  089D                        CALLG   $S$, a#DS$ENDSUB
                                   08A8  1224          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 4.6:  CHME instruction with PSL<IS>=1
                1227 ;+
                1228 ; Subtest description:
                1229 ;
                1230 ;       This subtest checks that a CHME instruction with PSL<IS>=1, will cause
                1231 ;       the processor to HALT (code = A).
                1232 ;
                1233 ; Subtest steps:
                1234 ;       SUBTEST CHME instruction with PSL<IS>=1
                1235 ;       :  Initialize Flags
                1236 ;       :  Clear RPB from location 0 in memory
                1237 ;       :  Get XFC vector to handle exception on interrupt stack
                1238 ;       :  Get interval timer vector to prevent outside interrupts
                1239 ;       :  Get CHME vector in case CHME instruction does execute
                1240 ;       :  Setup code to set done flag at loc 100
                1241 ;       :  Setup code to jump to RENTRY point in next loc
                1242 ;       :  IF operator present
                1243 ;       :  :  THEN
                1244 ;       :  :  Print restart instructions to operator
                1245 ;       :  ENDIF
                1246 ;       :  IF operator NOT present
                1247 ;       :  :  THEN
                1248 ;       :  :  Setup RPB at loc 0 pointing to loc 100
                1249 ;       :  ENDIF
                1250 ;       :  Execute an XFC instruction to get on interrupt stack
                1251 ;       :  Read current PSL
                1252 ;       :  IF NOT on interrupt stack
                1253 ;       :  :  THEN
                1254 ;       :  :  Report wrong stack error
                1255 ;       :  :  Exit test
                1256 ;       :  ENDIF
                1257 ;       :  Set ready to execute flag
                1258 ;       :  Execute CHME to cause processor to HALT
                1259 ;       :  (this should cause a CHME on interrupt stack HALT)
                1260 ;       :  IF CHME does not caues an exception
                1261 ;       :  :  THEN
                1262 ;       :  :  Set execption error flag
                1263 ;       :  ENDIF
                1264 ;       :  RENTRY point (restart enters here from exception)
                1265 ;       :  IF execption error flag set
                1266 ;       :  :  THEN
                1267 ;       :  :  Report CHME execption error
                1268 ;       :  :  Exit test
                1269 ;       :  ENDIF
                1270 ;       :  IF CHME instruction executed flag set
                1271 ;       :  :  THEN
                1272 ;       :  :  Report change mode error
                1273 ;       :  :  Exit test
                1274 ;       :  ENDIF
                1275 ;       :  IF done flag not set
                1276 ;       :  :  THEN
                1277 ;       :  :  Report done error
                1278 ;       :  :  Exit test
                1279 ;       :  ENDIF
                1280 ;       :  Modify PC on stack to point to RENTRY2
```

```
                                08A8  1281 ;       :  Execute REI to get back to correct stack
                                08A8  1282 ;       :  RENTRY2 point
                                08A8  1283 ;       :  Read PSL
                                08A8  1284 ;       :  IF IS not clear
                                08A8  1285 ;       :  :  THEN
                                08A8  1286 ;       :  :  Report incorrect stack error in clean up
                                08A8  1287 ;       :  :  Exit test
                                08A8  1288 ;       :  ENDIF
                                08A8  1289 ;       :  Release interval timer vector
                                08A8  1290 ;       :  Release CHME vector
                                08A8  1291 ;       :  Release XFC vector
                                08A8  1292 ;       ENDSUBTEST CHME instruction with PSL<IS>=1
                                08A8  1293 ;
                                08A8  1294 ;-
                                08A8  1295         $DS_BGNSUB
                                08A8               T4_S6::
 00010030 9F   0000003C'EF   FA 08A8                       CALLG   $S$, a#DS$BGNSUB
               00000BF8'EF   16 08B3  1296         JSB     CLEAR_RPB                   ; disable restart parameter block
               00000C2A'EF   16 08B9  1297         JSB     CLEAR_BUFFER                ; clear data buffers
               0000003C'EF   D4 08BF  1298         CLRL    L_FLAGS                     ; initialize flags
                             08C5  1299         $DS_SETVEC_S    VECTOR=#SCB$L_OPCCUS,SRVADR=RENTRY10,CODE=#1
                          01 DD 08C5                       PUSHL   #1
                000008EC'EF   DF 08C7                       PUSHAL  RENTRY10
                          14  DD 08CD                       PUSHL   #SCB$L_OPCCUS
             00010160 9F   03   FB 08CF                       CALLS   #3, a#DS$SETVEC
                             08D6  1300 1$:     $DS_SETVEC_S    VECTOR=#SCB$L_CHME,SRVADR=CHMX_SERVICE
                          00 DD 08D6                       PUSHL   #0
                00000CC4'EF   DF 08D8                       PUSHAL  CHMX_SERVICE
                00000044 8F   DD 08DE                       PUSHL   #SCB$L_CHME
             00010160 9F   03   FB 08E4                       CALLS   #3, a#DS$SETVEC
                             08EB  1301
                             FC 08EB  1302 2$:      XFC                                 ; execute XFC instruction to cause
                             08EC  1303                                                 ; exception which will get on IS
                             08EC  1304         .ALIGN  LONG
                             08EC  1305 RENTRY10:
                00000000'EF   DC 08EC  1306         MOVPSL  L_ACT_PSL                   ; read PSL
          1A 00000000'EF   1A   E0 08F2  1307         BBS     #PSL$V_IS,L_ACT_PSL,3$      ; br = on interrupt stack
                             08FA  1308         $DS_ERRHARD_S   UNIT=#0,MSGADR=T_NOT_ON_IS
                          00 DD 08FA                       PUSHL   #0
                0000089B'EF   DF 08FC                       PUSHAL  T_NOT_ON_IS
                          00  DD 0902                       PUSHL   #0
                          01  DD 0904                       PUSHL   #$ER
                             0906       ;;; TEST 4, SUBTEST 6, ERROR 1
             000100D0 9F   04   FB 0906                       CALLS   #$$M, a#DS$ERRHARD
                             090D  1309         $DS_ABORT
             00010020 9F   6C   FA 090D                       CALLG   (AP), a#DS$ABORT
 00000100'EF   00000040'EF   7D 0914  1310 3$:      MOVQ    JUMP,RESTART                ; setup code to renter after halt
 00000108'EF   00000048'EF   7D 091F  1311          MOVQ    JUMP+8,RESTART+8            ; load rest of rentry code
 00000004'EF   000009AD'EF   DE 092A  1312          MOVAL   RENTRY11,RENTRY_POINT       ; load rentry address
       08 0000FE00'EF   0C   E0 0935  1313          BBS     #DSA$V_OPER,DSA$GL_FLAGS,4$ ; br = operator present
                00000C00'EF   16 093D  1314          JSB     SETUP_RPB                   ; no operator, use auto restart
                          22  11 0943  1315          BRB     5$                          ; skip over message
                             0945  1316 4$:      $DS_PRINTF_S    FORMAT=T_INSTRUCTIONS,P0=#6$,P1=#CODE_0A
                          0A DD 0945                       PUSHL   #CODE_0A
                000009A4'8F   DD 0947                       PUSHL   #6$
```

```
                 000001DC'EF   9F  094D                        PUSHAB  T_INSTRUCTIONS
             000100F0 9F   03   FB  0953                        CALLS   #$$N, a#DS$PRINTF
                                   095A  1317          $DS_PRINTF_S    FORMAT=T_CONTINUE
                 00000212'EF   9F  095A                        PUSHAB  T_CONTINUE
             000100F0 9F   01   FB  0960                        CALLS   #$$N, a#DS$PRINTF
             00000020'EF   5E   D0  0967  1318 5$:      MOVL    SP,L_CUR_ISP
00000000'EF  00000000'EF   08   C3  096E  1319          SUBL3   #8,L_ISP,L_EXP_SP       ; load expected SP
     00000000'EF  00000000'EF   D0  097A  1320          MOVL    L_KSP,L_EXP_KSP         ; load expected KSP
             00000000'EF   00   D0  0985  1321          MOVL    #0,L_EXP_ISP            ; ISP unpredictable if on int. stack
     00000000'EF  0000098B'EF   D0  098C  1322          MOVL    DATA_4,L_EXP_PSL        ; load expected PSL
             00000C42'EF   16   0997  1323          JSB     LOAD_GPR                ; load GPR's with data
             0000003C'EF   01   C8  099D  1324          BISL2   #M_READY,L_FLAGS        ; set ready to execute flag
                           00   BD  09A4  1325 6$:      CHME    #0                      ; execute change mode instruction
             0000003C'EF   04   C8  09A6  1326          BISL2   #M_EXECUTE_ERR,L_FLAGS  ; if no exception occurs will get here
                                   09AD  1327 RENTRY11:                               ; will renter here when completed
          11 00000000'EF   1A   E1  09AD  1328          BBC     #PSL$V_IS,L_ACT_PSL,8$  ; br = not on IS as expected
             5E   00000020'EF   D0  09B5  1329          MOVL    L_CUR_ISP,SP            ; reset IS SP
             6E   000009C4'8F   D0  09BC  1330          MOVL    #7$,(SP)                ; setup return address
                                02  09C3  1331          REI                             ; get off interrupt stack
                           0B   11  09C4  1332 7$:      BRB     9$                      ; skip IPR load
     00000000'8F   00000020'EF   DA  09C6  1333 8$:      MTPR    L_CUR_ISP,#PR$_ISP      ; load IS SP into IPR
             00000CE5'EF   16   09D1  1334 9$:      JSB     ERROR_CHECK             ; check for errors (GPR's,AP,FP,PSL)
          28 0000003C'EF   0C   E1  09D7  1335          BBC     #V_ERROR_FLAG,L_FLAGS,10$ ; br = no errors
                                   09DF  1336          $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_CHME_ERR
                 000003DD'8F   DD  09DF                        PUSHL   #T_CHME_ERR
                 0000099B'EF   DF  09E5                        PUSHAL  ERR_MESSAGE
                           00   DD  09EB                        PUSHL   #0
                           00   DD  09ED                        PUSHL   #0
                           02   DD  09EF                        PUSHL   #$ER
                                09F1              ;;; TEST 4, SUBTEST 6, ERROR 2
             000100D0 9F   05   FB  09F1                        CALLS   #$$M, a#DS$ERRHARD
          07 0000003C'EF   08   E1  09F8  1337          BBC     #V_FATAL_ERR,L_FLAGS,10$ ; br = no fatal errors
                                   0A00  1338          $DS_ABORT
             00010020 9F   6C   FA  0A00                        CALLG   (AP), a#DS$ABORT
                                   0A07  1339 10$:      $DS_CLRVEC_S    VECTOR=#SCB$L_OPCCUS
                           14   DD  0A07                        PUSHL   #SCB$L_OPCCUS
             00010168 9F   01   FB  0A09                        CALLS   #1, a#DS$CLRVEC
                                   0A10  1340          $DS_CLRVEC_S    VECTOR=#SCB$L_CHME
                  00000044 8F   DD  0A10                        PUSHL   #SCB$L_CHME
             00010168 9F   01   FB  0A16                        CALLS   #1, a#DS$CLRVEC
                                   0A1D  1341          $DS_ENDSUB
                                0A1D              T4_S6_X:
00010038 9F   0000003C'EF   FA  0A1D                        CALLG   $S$, a#DS$ENDSUB
                                   0A28  1342          $DS_PAGE
```

```
0A28                    .SBTTL  SUBTEST 4.7:  CHMK instruction with PSL<IS>=1
0A28  1345 ;+
0A28  1346 ; Subtest description:
0A28  1347 ;
0A28  1348 ;       This subtest checks that a CHMK instruction with PSL<IS>=1, will cause
0A28  1349 ;       the processor to HALT (code = A).
0A28  1350 ;
0A28  1351 ; Subtest steps:
0A28  1352 ;
0A28  1353 ;       SUBTEST CHMK instruction with PSL<IS>=1
0A28  1354 ;       :  Initialize Flags
0A28  1355 ;       :  Clear RPB from location 0 in memory
0A28  1356 ;       :  Get XFC vector to handle exception on interrupt stack
0A28  1357 ;       :  Get interval timer vector to prevent outside interrupts
0A28  1358 ;       :  Get CHMK vector in case CHMK instruction does execute
0A28  1359 ;       :  Setup code to set done flag at loc 100
0A28  1360 ;       :  Setup code to jump to RENTRY point in next loc
0A28  1361 ;       :  IF operator present
0A28  1362 ;       :  :  THEN
0A28  1363 ;       :  :  Print restart instructions to operator
0A28  1364 ;       :  ENDIF
0A28  1365 ;       :  IF operator NOT present
0A28  1366 ;       :  :  THEN
0A28  1367 ;       :  :  Setup RPB at loc 0 pointing to loc 100
0A28  1368 ;       :  ENDIF
0A28  1369 ;       :  Execute an XFC instruction to get on interrupt stack
0A28  1370 ;       :  Read current PSL
0A28  1371 ;       :  IF NOT on interrupt stack
0A28  1372 ;       :  :  THEN
0A28  1373 ;       :  :  Report wrong stack error
0A28  1374 ;       :  :  Exit test
0A28  1375 ;       :  ENDIF
0A28  1376 ;       :  Set ready to execute flag
0A28  1377 ;       :  Execute CHMK to cause processor to HALT
0A28  1378 ;       :  (this should cause a CHMK on interrupt stack HALT)
0A28  1379 ;       :  IF CHMK does not caues an exception
0A28  1380 ;       :  :  THEN
0A28  1381 ;       :  :  Set execption error flag
0A28  1382 ;       :  ENDIF
0A28  1383 ;       :  RENTRY point (restart enters here from exception)
0A28  1384 ;       :  IF execption error flag set
0A28  1385 ;       :  :  THEN
0A28  1386 ;       :  :  Report CHMK execption error
0A28  1387 ;       :  :  Exit test
0A28  1388 ;       :  ENDIF
0A28  1389 ;       :  IF CHMK instruction executed flag set
0A28  1390 ;       :  :  THEN
0A28  1391 ;       :  :  Report change mode error
0A28  1392 ;       :  :  Exit test
0A28  1393 ;       :  ENDIF
0A28  1394 ;       :  IF done flag not set
0A28  1395 ;       :  :  THEN
0A28  1396 ;       :  :  Report done error
0A28  1397 ;       :  :  Exit test
0A28  1398 ;       :  ENDIF
```

```
                                0A28  1399 ;       : Modify PC on stack to point to RENTRY2
                                0A28  1400 ;       : Execute REI to get back to correct stack
                                0A28  1401 ;       : RENTRY2 point
                                0A28  1402 ;       : Read PSL
                                0A28  1403 ;       : IF IS not clear
                                0A28  1404 ;       : : THEN
                                0A28  1405 ;       : : Report incorrect stack error in clean up
                                0A28  1406 ;       : : Exit test
                                0A28  1407 ;       : ENDIF
                                0A28  1408 ;       : Release interval timer vector
                                0A28  1409 ;       : Release CHMK vector
                                0A28  1410 ;       : Release XFC vector
                                0A28  1411 ;       ENDSUBTEST CHMK instruction with PSL<IS>=1
                                0A28  1412 ;
                                0A28  1413 ;-
                                0A28  1414         $DS_BGNSUB
                                0A28       T4_S7::
00010030 9F   00000048'EF   FA  0A28                CALLG   $S$, a#DS$BGNSUB
              00000BF8'EF   16  0A33  1415          JSB     CLEAR_RPB               ; disable restart parameter block
              00000C2A'EF   16  0A39  1416          JSB     CLEAR_BUFFER            ; clear data buffers
              0000003C'EF   D4  0A3F  1417          CLRL    L_FLAGS                 ; initialize flags
                                0A45  1418          $DS_SETVEC_S    VECTOR=#SCB$L_OPCCUS,SRVADR=RENTRY12,CODE=#1
                          01  DD  0A45                PUSHL   #1
                00000A6C'EF   DF  0A47                PUSHAL  RENTRY12
                          14  DD  0A4D                PUSHL   #SCB$L_OPCCUS
           00010160 9F    03  FB  0A4F                CALLS   #3, a#DS$SETVEC
                                0A56  1419 1$:      $DS_SETVEC_S    VECTOR=#SCB$L_CHMK,SRVADR=CHMX_SERVICE
                          00  DD  0A56                PUSHL   #0
                00000CC4'EF   DF  0A58                PUSHAL  CHMX_SERVICE
                00000040 8F   DD  0A5E                PUSHL   #SCB$L_CHMK
           00010160 9F    03  FB  0A64                CALLS   #3, a#DS$SETVEC
                                0A6B  1420
                               FC  0A6B  1421 2$:     XFC                             ; execute XFC instruction to cause
                                0A6C  1422                                           ; exception which will get on IS
                                0A6C  1423          .ALIGN  LONG
                                0A6C  1424 RENTRY12:
                00000000'EF   DC  0A6C  1425          MOVPSL  L_ACT_PSL               ; read PSL
        1A 00000000'EF    1A  E0  0A72  1426          BBS     #PSL$V_IS,L_ACT_PSL,3$  ; br = on interrupt stack
                                0A7A  1427          $DS_ERRHARD_S   UNIT=#0,MSGADR=T_NOT_ON_IS
                          00  DD  0A7A                PUSHL   #0
                0000089B'EF   DF  0A7C                PUSHAL  T_NOT_ON_IS
                          00  DD  0A82                PUSHL   #0
                          01  DD  0A84                PUSHL   #$ER
                                0A86        ;;; TEST 4, SUBTEST 7, ERROR 1
           000100D0 9F    04  FB  0A86                CALLS   #$$M, a#DS$ERRHARD
                                0A8D  1428          $DS_ABORT
           00010020 9F    6C  FA  0A8D                CALLG   (AP), a#DS$ABORT
00000100'EF   00000040'EF   7D  0A94  1429 3$:      MOVQ    JUMP,RESTART            ; setup code to renter after halt
00000108'EF   00000048'EF   7D  0A9F  1430          MOVQ    JUMP+8,RESTART+8        ; load rest of rentry code
00000004'EF   00000B2D'EF   DE  0AAA  1431          MOVAL   RENTRY13,RENTRY_POINT   ; load rentry address
      08 0000FE00'EF    0C  E0  0AB5  1432          BBS     #DSA$V_OPER,DSA$GL_FLAGS,4$ ; br = operator present
                00000C00'EF   16  0ABD  1433          JSB     SETUP_RPB               ; no operator, use auto restart
                          22  11  0AC3  1434          BRB     5$                      ; skip over message
                                0AC5  1435 4$:      $DS_PRINTF_S    FORMAT=T_INSTRUCTIONS,P0=#6$,P1=#CODE_0A
                          0A  DD  0AC5                PUSHL   #CODE_0A
```

```
                00000B24'8F    DD   0AC7                        PUSHL   #6$
                000001DC'EF    9F   0ACD                        PUSHAB  T_INSTRUCTIONS
            000100F0 9F    03  FB   0AD3                        CALLS   #$$N, @#DS$PRINTF
                                0ADA  1436          $DS_PRINTF_S    FORMAT=T_CONTINUE
                00000212'EF    9F   0ADA                        PUSHAB  T_CONTINUE
            000100F0 9F    01  FB   0AE0                        CALLS   #$$N, @#DS$PRINTF
            00000020'EF    5E   D0   0AE7  1437 5$:    MOVL    SP,L_CUR_ISP
00000000'EF 00000000'EF    08   C3   0AEE  1438        SUBL3   #8,L_ISP,L_EXP_SP       ; load expected SP
     00000000'EF 00000000'EF    D0   0AFA  1439        MOVL    L_KSP,L_EXP_KSP         ; load expected KSP
            00000000'EF    00   D0   0B05  1440        MOVL    #0,L_EXP_ISP            ; ISP unpredictable if on int. stack
     00000000'EF 0000098B'EF    D0   0B0C  1441        MOVL    DATA_4,L_EXP_PSL        ; load expected PSL
            00000C42'EF    16   0B17  1442        JSB     LOAD_GPR                ; load GPR's with data
            0000003C'EF    01   C8   0B1D  1443        BISL2   #M_READY,L_FLAGS        ; set ready to execute flag
                           00   BC   0B24  1444 6$:    CHMK    #0                      ; execute change mode instruction
            0000003C'EF    04   C8   0B26  1445        BISL2   #M_EXECUTE_ERR,L_FLAGS  ; if no exception occurs will get here
                                0B2D  1446 RENTRY13:                                ; will renter here when completed
         11 00000000'EF    1A   E1   0B2D  1447        BBC     #PSL$V_IS,L_ACT_PSL,8$  ; br = not on IS as expected
            5E  00000020'EF    D0   0B35  1448        MOVL    L_CUR_ISP,SP            ; reset IS SP
            6E  00000B44'8F    D0   0B3C  1449        MOVL    #7$,(SP)                ; setup return address
                           02   0B43  1450        REI                             ; get off interrupt stack
                           0B   11   0B44  1451 7$:    BRB     9$                      ; skip IPR load
     00000000'8F 00000020'EF    DA   0B46  1452 8$:    MTPR    L_CUR_ISP,#PR$_ISP      ; load IS SP into IPR
            00000CE5'EF    16   0B51  1453 9$:    JSB     ERROR_CHECK             ; check for errors (GPR's,AP,FP,PSL)
         28 0000003C'EF    0C   E1   0B57  1454        BBC     #V_ERROR_FLAG,L_FLAGS,10$ ; br = no errors
                                0B5F  1455        $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_CHMK_ERR
                00000405'8F    DD   0B5F                        PUSHL   #T_CHMK_ERR
                0000099B'EF    DF   0B65                        PUSHAL  ERR_MESSAGE
                           00   DD   0B6B                        PUSHL   #0
                           00   DD   0B6D                        PUSHL   #0
                           02   DD   0B6F                        PUSHL   #$ER
                                0B71        ;;; TEST 4, SUBTEST 7, ERROR 2
            000100D0 9F    05  FB   0B71                        CALLS   #$$M, @#DS$ERRHARD
         07 0000003C'EF    08   E1   0B78  1456        BBC     #V_FATAL_ERR,L_FLAGS,10$ ; br = no fatal errors
                                0B80  1457        $DS_ABORT
            00010020 9F    6C   FA   0B80                        CALLG   (AP), @#DS$ABORT
                                0B87  1458 10$:     $DS_CLRVEC_S    VECTOR=#SCB$L_OPCCUS
                           14   DD   0B87                        PUSHL   #SCB$L_OPCCUS
            00010168 9F    01   FB   0B89                        CALLS   #1, @#DS$CLRVEC
                                0B90  1459          $DS_CLRVEC_S    VECTOR=#SCB$L_CHMK
                 00000040 8F    DD   0B90                        PUSHL   #SCB$L_CHMK
            00010168 9F    01   FB   0B96                        CALLS   #1, @#DS$CLRVEC
                                0B9D  1460          $DS_ENDSUB
                                0B9D        T4_S7_X:
00010038 9F    00000048'EF    FA   0B9D                        CALLG   $S$, @#DS$ENDSUB
                                0BA8  1461          $DS_CLRVEC_S    VECTOR=#SCB$L_TIMER
                 000000C0 8F    DD   0BA8                        PUSHL   #SCB$L_TIMER
            00010168 9F    01   FB   0BAE                        CALLS   #1, @#DS$CLRVEC
                                0BB5  1462          $DS_ENDTEST
                      50   01   D0   0BB5                        MOVL    #1, R0          ; NORMAL EXIT
                                0BB8        TEST_004_X::
            00010058 9F    6E   FA   0BB8                        CALLG   (SP), @#DS$BREAK
                                0BBF                        RET                     ; RETURN TO TEST SEQUENCER
                                0BC0  1463          $DS_PAGE
                                0BC0  1464
                                0BC0  1465
```

```
                       0BC0                 .SBTTL  TEST 5:  PROCESSOR HALTS ARCH. UNDEFINED
                   00000000                         .PSECT  TEST_005, PAGE, NOWRT
                       0024
                       0024   1468 ;++
                       0024   1469 ; Test description:
                       0024   1470 ;
                       0024   1471 ;       This test checks the various ways the VAX-11/730 processor can
                       0024   1472 ;       be halted in an architecturally undefined manner. This includes
                       0024   1473 ;       change mode instructions with the vector specifying service on
                       0024   1474 ;       the interrupt stack, invalid vector halt, SCBB read error halt,
                       0024   1475 ;       double machine check halt, and transfer to NXM user WCS halt.
                       0024   1476 ;
                       0024   1477 ;       INSTRUCTIONS FOR EARLY ABORT:  If it is desired to exit the test
                       0024   1478 ;       before completion, one must wait for the console prompt ( >>> )
                       0024   1479 ;       after the halt occurs and type in the sequence D PC adr <CR>
                       0024   1480 ;       C <CR>, where adr is the absolute address of the label
                       0024   1481 ;       TEST_004_X:: in the program listing.
                       0024   1482 ;
                       0024   1483 ;--
                       0024   1484
                       0024   1485
                       0024   1486         $DS_BGNTEST     <MANUAL,HALT,ALL>
                       0024           DATA_005:
                   00000000   0024                   .LONG   0                       ; TEST ARGUMENT TABLE TERMINATOR
                       0028           TEST_005::
                       0000   0028                   .WORD   ^M<>                    ; ENTRY MASK
                       002A   1487         $DS_BOPER 5$                               ; Is operator present?
                         0C    E0   002A                   BBS     #DSA$V_OPER,-      ; BR IF OPERATOR
                   14 0000FE00 9F     002C                           a#DSA$GL_FLAGS, 5$
                       0032   1488         $DS_PRINTF_S    FORMAT=T_NO_OPER            ;5.2
                   0000004D'EF   9F   0032                   PUSHAB  T_NO_OPER
                   000100F0 9F   01   FB 0038                CALLS   #$$N, a#DS$PRINTF
                       003F   1489         $DS_ABORT                                  ; No. abort
                   00010020 9F   6C   FA 003F                CALLG   (AP), a#DS$ABORT
                       0046   1490
                       0046   1491 5$:     $DS_PRINTF_S    FORMAT=T_WARNING            ; print warning
                   00000262'EF   9F   0046                   PUSHAB  T_WARNING
                   000100F0 9F   01   FB 004C                CALLS   #$$N, a#DS$PRINTF
                       0053   1492
                       0053   1493
                   00000000'EF   5E   D0 0053   1494         MOVL    SP,L_KSP                ; save initial KSP
00000000'EF   00000000'8F   DB   005A   1495         MFPR    #PR$_ISP,L_ISP          ; save initial ISP
                   00000C2A'EF   16   0065   1496         JSB     CLEAR_BUFFER            ; clear buffer area
                       006B   1497         $DS_SETVEC_S    VECTOR=#SCB$L_TIMER, SRVADR=TIMER_SERVICE
                         00    DD   006B                   PUSHL   #0
                   00000CB8'EF   DF   006D                   PUSHAL  TIMER_SERVICE
                   000000C0 8F   DD   0073                   PUSHL   #SCB$L_TIMER
                   00010160 9F   03   FB 0079                CALLS   #3, a#DS$SETVEC
                       0080   1498 10$:
                       0080   1499         $DS_PAGE
```

```
                                0080                .SBTTL  SUBTEST 5.1:  CHMU inst. with vector service on IS
                                0080  1502 ;+
                                0080  1503 ; Subtest description:
                                0080  1504 ;
                                0080  1505 ;       This subtest checks that a CHMU instruction with the SCB vector entry
                                0080  1506 ;       <1:0>=1 specifying service on the interrupt stack will cause
                                0080  1507 ;       the processor to HALT (code = B).
                                0080  1508 ;
                                0080  1509 ; Subtest steps:
                                0080  1510 ;
                                0080  1511 ;       SUBTEST CHMU instruction with vector service on IS
                                0080  1512 ;       : Initialize Flags
                                0080  1513 ;       : Get interval timer vector to prevent outside interrupts
                                0080  1514 ;       : Get CHMU vector specifying service on IS
                                0080  1515 ;       : Setup code to set done flag at loc 100
                                0080  1516 ;       : Setup code to jump to RENTRY point in next loc
                                0080  1517 ;       : Print restart instructions to operator
                                0080  1518 ;       : Set ready to execute flag
                                0080  1519 ;       : Execute CHMU to cause processor to HALT
                                0080  1520 ;       : (this should cause a CHMU service on interrupt stack HALT)
                                0080  1521 ;       : IF CHMU does not caues an exception
                                0080  1522 ;       : : THEN
                                0080  1523 ;       : : Set exception error flag
                                0080  1524 ;       : ENDIF
                                0080  1525 ;       : RENTRY point (restart enters here from exception)
                                0080  1526 ;       : IF exception error flag set
                                0080  1527 ;       : : THEN
                                0080  1528 ;       : : Report CHMU exception error
                                0080  1529 ;       : : Exit test
                                0080  1530 ;       : ENDIF
                                0080  1531 ;       : IF CHMU instruction executed flag set
                                0080  1532 ;       : : THEN
                                0080  1533 ;       : : Report change mode error
                                0080  1534 ;       : : Exit test
                                0080  1535 ;       : ENDIF
                                0080  1536 ;       : IF done flag not set
                                0080  1537 ;       : : THEN
                                0080  1538 ;       : : Report done error
                                0080  1539 ;       : : Exit test
                                0080  1540 ;       : ENDIF
                                0080  1541 ;       : Read PSL
                                0080  1542 ;       : IF IS not clear
                                0080  1543 ;       : : THEN
                                0080  1544 ;       : : Report incorrect stack error in clean up
                                0080  1545 ;       : : Exit test
                                0080  1546 ;       : ENDIF
                                0080  1547 ;       : Release interval timer vector
                                0080  1548 ;       : Release CHMU vector
                                0080  1549 ;       ENDSUBTEST CHMU instruction with
                                0080  1550 ;
                                0080  1551 ;-
                                0080  1552          $DS_BGNSUB
                                0080          T5_S1::
00010030 9F   00000054'EF   FA  0080                CALLG   $S$, a#DS$BGNSUB
         00000C2A'EF        16  008B  1553          JSB     CLEAR_BUFFER                ; clear data buffers
```

```
                0000003C'EF   D4  0091  1554          CLRL    L_FLAGS                         ; initialize flags
                              0097  1555 1$:       $DS_SETVEC_S    VECTOR=#SCB$L_CHMU,SRVADR=CHMX_SERVICE,CODE=#1
                        01    DD  0097                    PUSHL   #1
                00000CC4'EF   DF  0099                    PUSHAL  CHMX_SERVICE
                0000004C 8F   DD  009F                    PUSHL   #SCB$L_CHMU
             00010160 9F      03  FB  00A5                CALLS   #3, @#DS$SETVEC
                              00AC  1556
    00000100'EF   00000040'EF   7D  00AC  1557 3$:       MOVQ    JUMP,RESTART                    ; setup code to renter after halt
    00000108'EF   00000048'EF   7D  00B7  1558          MOVQ    JUMP+8,RESTART+8                ; load rest of rentry code
    00000004'EF   0000013C'EF   DE  00C2  1559          MOVAL   RENTRY15,RENTRY_POINT           ; load rentry address
                              00CD  1560 4$:       $DS_PRINTF_S    FORMAT=T_INSTRUCTIONS,P0=#6$,P1=#CODE_0B
                        0B    DD  00CD                    PUSHL   #CODE_0B
                00000133'8F   DD  00CF                    PUSHL   #6$
                000001DC'EF   9F  00D5                    PUSHAB  T_INSTRUCTIONS
             000100F0 9F      03  FB  00DB                CALLS   #$$N, @#DS$PRINTF
                              00E2  1561          $DS_PRINTF_S    FORMAT=T_CONTINUE
                00000212'EF   9F  00E2                    PUSHAB  T_CONTINUE
             000100F0 9F      01  FB  00E8                CALLS   #$$N, @#DS$PRINTF
    00000020'EF   00000000'EF   D0  00EF  1562 5$:       MOVL    L_ISP,L_CUR_ISP                 ; save current IS SP
    00000000'EF   00000000'EF   D0  00FA  1563          MOVL    L_KSP,L_EXP_SP                  ; load expected SP
    00000000'EF   00000000'EF   D0  0105  1564          MOVL    L_KSP,L_EXP_KSP                 ; load expected KSP
    00000000'EF   00000000'EF   D0  0110  1565          MOVL    L_ISP,L_EXP_ISP                 ; load expected ISP
    00000000'EF   0000097F'EF   D0  011B  1566          MOVL    DATA_1,L_EXP_PSL                ; load expected PSL
                00000C42'EF   16  0126  1567          JSB     LOAD_GPR                        ; load GPR's with data
             0000003C'EF      01  C8  012C  1568          BISL2   #M_READY,L_FLAGS                ; set ready to execute flag
                        00    BF  0133  1569 6$:       CHMU    #0                              ; execute change mode instruction
             0000003C'EF      04  C8  0135  1570          BISL2   #M_EXECUTE_ERR,L_FLAGS          ; if no exception occurs will get here
                              013C  1571 RENTRY15:                                              ; will renter here when completed
          1C 00000000'EF      1A  E1  013C  1572          BBC     #PSL$V_IS,L_ACT_PSL,9$          ; br = not on IS as expected
             5E   00000020'EF   D0  0144  1573          MOVL    L_CUR_ISP,SP                    ; reset IS SP
             6E   00000153'8F   D0  014B  1574          MOVL    #7$,(SP)                        ; setup return address
                              02  0152  1575          REI                                     ; get off interrupt stack
                        0B    11  0153  1576 7$:       BRB     9$                              ; skip IPR load
    00000000'8F   00000020'EF   DA  0155  1577 8$:       MTPR    L_CUR_ISP,#PR$_ISP              ; load IS SP into IPR
                00000CE5'EF   16  0160  1578 9$:       JSB     ERROR_CHECK                     ; check for errors (GPR's,AP,FP,PSL)
          2C 0000003C'EF      0C  E1  0166  1579          BBC     #V_ERROR_FLAG,L_FLAGS,10$ ; br = no errors
                              016E  1580          $DS_ERRHARD_S   UNIT=KA_UNIT_NO, PRLINK=ERR_MESSAGE,P1=#T_CHMUSCB_ERR
                000004B5'8F   DD  016E                    PUSHL   #T_CHMUSCB_ERR
                0000099B'EF   DF  0174                    PUSHAL  ERR_MESSAGE
                        00    DD  017A                    PUSHL   #0
                00000000'EF   DD  017C                    PUSHL   KA_UNIT_NO
                        01    DD  0182                    PUSHL   #$ER
                              0184      ;;; TEST 5, SUBTEST 1, ERROR 1
             000100D0 9F      05  FB  0184                CALLS   #$$M, @#DS$ERRHARD
          07 0000003C'EF      08  E1  018B  1581          BBC     #V_FATAL_ERR,L_FLAGS,10$ ; br = no fatal errors
                              0193  1582          $DS_ABORT
             00010020 9F      6C  FA  0193                CALLG   (AP), @#DS$ABORT
                              019A  1583 10$:      $DS_CLRVEC_S    VECTOR=#SCB$L_CHMU
                0000004C 8F   DD  019A                    PUSHL   #SCB$L_CHMU
             00010168 9F      01  FB  01A0                CALLS   #1, @#DS$CLRVEC
                              01A7  1584          $DS_ENDSUB
                              01A7      T5_S1_X:
    00010038 9F   00000054'EF   FA  01A7                    CALLG   $S$, @#DS$ENDSUB
                              01B2  1585          $DS_PAGE
```

```
                     01B2                .SBTTL  SUBTEST 5.2:  CHMS inst. with vector service on IS
                     01B2  1588 ;+
                     01B2  1589 ; Subtest description:
                     01B2  1590 ;
                     01B2  1591 ;       This subtest checks that a CHMS instruction with the SCB vector entry
                     01B2  1592 ;       <1:0>=1 specifying service on the interrupt stack will cause
                     01B2  1593 ;       the processor to HALT (code = B).
                     01B2  1594 ;
                     01B2  1595 ; Subtest steps:
                     01B2  1596 ;
                     01B2  1597 ;       SUBTEST CHMS instruction with vector service on IS
                     01B2  1598 ;       :  Initialize Flags
                     01B2  1599 ;       :  Get interval timer vector to prevent outside interrupts
                     01B2  1600 ;       :  Get CHMS vector specifying service on IS
                     01B2  1601 ;       :  Setup code to set done flag at loc 100
                     01B2  1602 ;       :  Setup code to jump to RENTRY point in next loc
                     01B2  1603 ;       :  Print restart instructions to operator
                     01B2  1604 ;       :  Set ready to execute flag
                     01B2  1605 ;       :  Execute CHMS to cause processor to HALT
                     01B2  1606 ;       :  (this should cause a CHMS service on interrupt stack HALT)
                     01B2  1607 ;       :  IF CHMS does not caues an exception
                     01B2  1608 ;       :  :  THEN
                     01B2  1609 ;       :  :  Set exception error flag
                     01B2  1610 ;       :  ENDIF
                     01B2  1611 ;       :  RENTRY point (restart enters here from exception)
                     01B2  1612 ;       :  IF exception error flag set
                     01B2  1613 ;       :  :  THEN
                     01B2  1614 ;       :  :  Report CHMS exception error
                     01B2  1615 ;       :  :  Exit test
                     01B2  1616 ;       :  ENDIF
                     01B2  1617 ;       :  IF CHMS instruction executed flag set
                     01B2  1618 ;       :  :  THEN
                     01B2  1619 ;       :  :  Report change mode error
                     01B2  1620 ;       :  :  Exit test
                     01B2  1621 ;       :  ENDIF
                     01B2  1622 ;       :  IF done flag not set
                     01B2  1623 ;       :  :  THEN
                     01B2  1624 ;       :  :  Report done error
                     01B2  1625 ;       :  :  Exit test
                     01B2  1626 ;       :  ENDIF
                     01B2  1627 ;       :  Read PSL
                     01B2  1628 ;       :  IF IS not clear
                     01B2  1629 ;       :  :  THEN
                     01B2  1630 ;       :  :  Report incorrect stack error in clean up
                     01B2  1631 ;       :  :  Exit test
                     01B2  1632 ;       :  ENDIF
                     01B2  1633 ;       :  Release interval timer vector
                     01B2  1634 ;       :  Release CHMS vector
                     01B2  1635 ;       ENDSUBTEST CHMS instruction with
                     01B2  1636 ;
                     01B2  1637 ;-
                     01B2  1638          $DS_BGNSUB
                     01B2          T5_S2::
00010030 9F   00000060'EF   FA  01B2                CALLG   $S$, a*DS$BGNSUB
              00000C2A'EF   16  01BD  1639          JSB     CLEAR_BUFFER              ; clear data buffers
```

```
                0000003C'EF   D4  01C3  1640          CLRL    L_FLAGS                         ; initialize flags
                              01C9  1641 1$:      $DS_SETVEC_S    VECTOR=#SCB$L_CHMS,SRVADR=CHMX_SERVICE,CODE=#1
                         01   DD  01C9                      PUSHL   #1
                00000CC4'EF   DF  01CB                      PUSHAL  CHMX_SERVICE
                00000048 8F   DD  01D1                      PUSHL   #SCB$L_CHMS
            00010160 9F   03   FB  01D7                      CALLS   #3, @#DS$SETVEC
                              01DE  1642
    00000100'EF   00000040'EF   7D  01DE  1643 3$:      MOVQ    JUMP,RESTART                    ; setup code to renter after halt
    00000108'EF   00000048'EF   7D  01E9  1644          MOVQ    JUMP+8,RESTART+8                ; load rest of rentry code
    00000004'EF   0000026E'EF   DE  01F4  1645          MOVAL   RENTRY16,RENTRY_POINT           ; load rentry address
                              01FF  1646 4$:      $DS_PRINTF_S    FORMAT=T_INSTRUCTIONS,P0=#6$,P1=#CODE_0B
                         0B   DD  01FF                      PUSHL   #CODE_0B
                00000265'8F   DD  0201                      PUSHL   #6$
                000001DC'EF   9F  0207                      PUSHAB  T_INSTRUCTIONS
            000100F0 9F   03   FB  020D                      CALLS   #$$N, @#DS$PRINTF
                              0214  1647          $DS_PRINTF_S    FORMAT=T_CONTINUE
                00000212'EF   9F  0214                      PUSHAB  T_CONTINUE
            000100F0 9F   01   FB  021A                      CALLS   #$$N, @#DS$PRINTF
    00000020'EF   00000000'EF   D0  0221  1648 5$:      MOVL    L_ISP,L_CUR_ISP                 ; save current IS SP
    00000000'EF   00000000'EF   D0  022C  1649          MOVL    L_KSP,L_EXP_SP                  ; load expected SP
    00000000'EF   00000000'EF   D0  0237  1650          MOVL    L_KSP,L_EXP_KSP                 ; load expected KSP
    00000000'EF   00000000'EF   D0  0242  1651          MOVL    L_ISP,L_EXP_ISP                 ; load expected ISP
    00000000'EF   0000097F'EF   D0  024D  1652          MOVL    DATA_1,L_EXP_PSL                ; load expected PSL
                00000C42'EF   16  0258  1653          JSB     LOAD_GPR                        ; load GPR's with data
            0000003C'EF   01   C8  025E  1654          BISL2   #M_READY,L_FLAGS                ; set ready to execute flag
                         00   BE  0265  1655 6$:      CHMS    #0                              ; execute change mode instruction
            0000003C'EF   04   C8  0267  1656          BISL2   #M_EXECUTE_ERR,L_FLAGS          ; if no exception occurs will get here
                              026E  1657 RENTRY16:                                           ; will renter here when completed
        1C 00000000'EF   1A   E1  026E  1658                  BBC     #PSL$V_IS,L_ACT_PSL,9$  ; br = not on IS as expected
           5E   00000020'EF   D0  0276  1659                  MOVL    L_CUR_ISP,SP            ; reset IS SP
           6E   00000285'8F   D0  027D  1660                  MOVL    #7$,(SP)                ; setup return address
                              02  0284  1661                  REI                             ; get off interrupt stack
                         0B   11  0285  1662 7$:              BRB     9$                      ; skip IPR load
    00000000'8F   00000020'EF   DA  0287  1663 8$:              MTPR    L_CUR_ISP,#PR$_ISP      ; load IS SP into IPR
                00000CE5'EF   16  0292  1664 9$:              JSB     ERROR_CHECK             ; check for errors (GPR's,AP,FP,PSL)
        2C 0000003C'EF   0C   E1  0298  1665                  BBC     #V_ERROR_FLAG,L_FLAGS,10$ ; br = no errors
                              02A0  1666                  $DS_ERRHARD_S   UNIT=KA_UNIT_NO, PRLINK=ERR_MESSAGE,P1=#T_CHMSSCB_ERR
                000004F0'8F   DD  02A0                      PUSHL   #T_CHMSSCB_ERR
                0000099B'EF   DF  02A6                      PUSHAL  ERR_MESSAGE
                         00   DD  02AC                      PUSHL   #0
                00000000'EF   DD  02AE                      PUSHL   KA_UNIT_NO
                         01   DD  02B4                      PUSHL   #$ER
                              02B6      ;;; TEST 5, SUBTEST 2, ERROR 1
            000100D0 9F   05   FB  02B6                      CALLS   #$$M, @#DS$ERRHARD
        07 0000003C'EF   08   E1  02BD  1667                  BBC     #V_FATAL_ERR,L_FLAGS,10$ ; br = no fatal errors
                              02C5  1668                  $DS_ABORT
           00010020 9F   6C   FA  02C5                      CALLG   (AP), @#DS$ABORT
                              02CC  1669 10$:      $DS_CLRVEC_S    VECTOR=#SCB$L_CHMS
                00000048 8F   DD  02CC                      PUSHL   #SCB$L_CHMS
            00010168 9F   01   FB  02D2                      CALLS   #1, @#DS$CLRVEC
                              02D9  1670                  $DS_ENDSUB
                              02D9      T5_S2_X:
    00010038 9F   00000060'EF   FA  02D9                      CALLG   $S$, @#DS$ENDSUB
                              02E4  1671          $DS_PAGE
```

```
                        02E4                    .SBTTL  SUBTEST 5.3:  CHME inst. with vector service on IS
                        02E4    1674 ;+
                        02E4    1675 ; Subtest description:
                        02E4    1676 ;
                        02E4    1677 ;       This subtest checks that a CHME instruction with the SCB vector entry
                        02E4    1678 ;       <1:0>=1 specifying service on the interrupt stack will cause
                        02E4    1679 ;       the processor to HALT (code = B).
                        02E4    1680 ;
                        02E4    1681 ; Subtest steps:
                        02E4    1682 ;
                        02E4    1683 ;       SUBTEST CHME instruction with vector service on IS
                        02E4    1684 ;       :  Initialize Flags
                        02E4    1685 ;       :  Get interval timer vector to prevent outside interrupts
                        02E4    1686 ;       :  Get CHME vector specifying service on IS
                        02E4    1687 ;       :  Setup code to set done flag at loc 100
                        02E4    1688 ;       :  Setup code to jump to RENTRY point in next loc
                        02E4    1689 ;       :  Print restart instructions to operator
                        02E4    1690 ;       :  Set ready to execute flag
                        02E4    1691 ;       :  Execute CHME to cause processor to HALT
                        02E4    1692 ;       :  (this should cause a CHME service on interrupt stack HALT)
                        02E4    1693 ;       :  IF CHME does not caues an exception
                        02E4    1694 ;       :  :  THEN
                        02E4    1695 ;       :  :  Set exception error flag
                        02E4    1696 ;       :  ENDIF
                        02E4    1697 ;       :  RENTRY point (restart enters here from exception)
                        02E4    1698 ;       :  IF exception error flag set
                        02E4    1699 ;       :  :  THEN
                        02E4    1700 ;       :  :  Report CHME exception error
                        02E4    1701 ;       :  :  Exit test
                        02E4    1702 ;       :  ENDIF
                        02E4    1703 ;       :  IF CHME instruction executed flag set
                        02E4    1704 ;       :  :  THEN
                        02E4    1705 ;       :  :  Report change mode error
                        02E4    1706 ;       :  :  Exit test
                        02E4    1707 ;       :  ENDIF
                        02E4    1708 ;       :  IF done flag not set
                        02E4    1709 ;       :  :  THEN
                        02E4    1710 ;       :  :  Report done error
                        02E4    1711 ;       :  :  Exit test
                        02E4    1712 ;       :  ENDIF
                        02E4    1713 ;       :  Read PSL
                        02E4    1714 ;       :  IF IS not clear
                        02E4    1715 ;       :  :  THEN
                        02E4    1716 ;       :  :  Report incorrect stack error in clean up
                        02E4    1717 ;       :  :  Exit test
                        02E4    1718 ;       :  ENDIF
                        02E4    1719 ;       :  Release interval timer vector
                        02E4    1720 ;       :  Release CHME vector
                        02E4    1721 ;       ENDSUBTEST CHME instruction with
                        02E4    1722 ;
                        02E4    1723 ;-
                        02E4    1724            $DS_BGNSUB
                        02E4            T5_S3::
00010030 9F   0000006C'EF   FA  02E4                    CALLG   $S$, a#DS$BGNSUB
              00000C2A'EF   16  02EF    1725            JSB     CLEAR_BUFFER            ; clear data buffers
```

```
                0000003C'EF   D4  02F5  1726          CLRL    L_FLAGS                         ; initialize flags
                              02FB  1727 1$:       $DS_SETVEC_S    VECTOR=#SCB$L_CHME,SRVADR=CHMX_SERVICE,CODE=#1
                         01   DD  02FB                      PUSHL   #1
                00000CC4'EF   DF  02FD                      PUSHAL  CHMX_SERVICE
                00000044 8F   DD  0303                      PUSHL   #SCB$L_CHME
            00010160 9F   03   FB  0309                      CALLS   #3, a#DS$SETVEC
                              0310  1728
    00000100'EF   00000040'EF   7D  0310  1729 3$:      MOVQ    JUMP,RESTART                    ; setup code to renter after halt
    00000108'EF   00000048'EF   7D  031B  1730          MOVQ    JUMP+8,RESTART+8                ; load rest of rentry code
    00000004'EF   000003A0'EF   DE  0326  1731          MOVAL   RENTRY17,RENTRY_POINT           ; load rentry address
                              0331  1732 4$:       $DS_PRINTF_S    FORMAT=T_INSTRUCTIONS,P0=#6$,P1=#CODE_0B
                         0B   DD  0331                      PUSHL   #CODE_0B
                00000397'8F   DD  0333                      PUSHL   #6$
                000001DC'EF   9F  0339                      PUSHAB  T_INSTRUCTIONS
            000100F0 9F   03   FB  033F                      CALLS   #$$N, a#DS$PRINTF
                              0346  1733          $DS_PRINTF_S    FORMAT=T_CONTINUE
                00000212'EF   9F  0346                      PUSHAB  T_CONTINUE
            000100F0 9F   01   FB  034C                      CALLS   #$$N, a#DS$PRINTF
    00000020'EF   00000000'EF   D0  0353  1734 5$:      MOVL    L_ISP,L_CUR_ISP                 ; save current IS SP
    00000000'EF   00000000'EF   D0  035E  1735          MOVL    L_KSP,L_EXP_SP                  ; load expected SP
    00000000'EF   00000000'EF   D0  0369  1736          MOVL    L_KSP,L_EXP_KSP                 ; load expected KSP
    00000000'EF   00000000'EF   D0  0374  1737          MOVL    L_ISP,L_EXP_ISP                 ; load expected ISP
    00000000'EF   0000097F'EF   D0  037F  1738          MOVL    DATA_1,L_EXP_PSL                ; load expected PSL
                00000C42'EF   16  038A  1739          JSB     LOAD_GPR                        ; load GPR's with data
            0000003C'EF   01   C8  0390  1740          BISL2   #M_READY,L_FLAGS                ; set ready to execute flag
                         00   BD  0397  1741 6$:      CHME    #0                              ; execute change mode instruction
            0000003C'EF   04   C8  0399  1742          BISL2   #M_EXECUTE_ERR,L_FLAGS          ; if no exception occurs will get here
                              03A0  1743 RENTRY17:                                          ; will renter here when completed
      1C 00000000'EF   1A   E1  03A0  1744          BBC     #PSL$V_IS,L_ACT_PSL,9$          ; br = not on IS as expected
         5E   00000020'EF   D0  03A8  1745          MOVL    L_CUR_ISP,SP                    ; reset IS SP
         6E   000003B7'8F   D0  03AF  1746          MOVL    #7$,(SP)                        ; setup return address
                         02   02  03B6  1747          REI                                     ; get off interrupt stack
                         0B   11  03B7  1748 7$:      BRB     9$                              ; skip IPR load
    00000000'8F   00000020'EF   DA  03B9  1749 8$:      MTPR    L_CUR_ISP,#PR$_ISP              ; load IS SP into IPR
                00000CE5'EF   16  03C4  1750 9$:      JSB     ERROR_CHECK                     ; check for errors (GPR's,AP,FP,PSL)
      2C 0000003C'EF   0C   E1  03CA  1751          BBC     #V_ERROR_FLAG,L_FLAGS,10$       ; br = no errors
                              03D2  1752          $DS_ERRHARD_S   UNIT=KA_UNIT_NO, PRLINK=ERR_MESSAGE,P1=#T_CHMESCB_ERR
                0000052B'8F   DD  03D2                      PUSHL   #T_CHMESCB_ERR
                0000099B'EF   DF  03D8                      PUSHAL  ERR_MESSAGE
                         00   DD  03DE                      PUSHL   #0
                00000000'EF   DD  03E0                      PUSHL   KA_UNIT_NO
                         01   DD  03E6                      PUSHL   #$ER
                              03E8      ;;; TEST 5, SUBTEST 3, ERROR 1
                              03E8                      CALLS   #$$M, a#DS$ERRHARD
      07 0000003C'EF   08   E1  03EF  1753          BBC     #V_FATAL_ERR,L_FLAGS,10$ ; br = no fatal errors
                              03F7  1754          $DS_ABORT
         00010020 9F   6C   FA  03F7                      CALLG   (AP), a#DS$ABORT
                              03FE  1755 10$:      $DS_CLRVEC_S    VECTOR=#SCB$L_CHME
                00000044 8F   DD  03FE                      PUSHL   #SCB$L_CHME
         00010168 9F   01   FB  0404                      CALLS   #1, a#DS$CLRVEC
                              040B  1756          $DS_ENDSUB
                              040B      T5_S3_X:
    00010038 9F   0000006C'EF   FA  040B                      CALLG   $S$, a#DS$ENDSUB
                              0416  1757          $DS_PAGE
```

```
                     0416                   .SBTTL  SUBTEST 5.4:  CHMK inst. with vector service on IS
                     0416  1760 ;+
                     0416  1761 ; Subtest description:
                     0416  1762 ;
                     0416  1763 ;       This subtest checks that a CHMK instruction with the SCB vector entry
                     0416  1764 ;       <1:0>=1 specifying service on the interrupt stack will cause
                     0416  1765 ;       the processor to HALT (code = B).
                     0416  1766 ;
                     0416  1767 ; Subtest steps:
                     0416  1768 ;
                     0416  1769 ;       SUBTEST CHMK instruction with vector service on IS
                     0416  1770 ;       :  Initialize Flags
                     0416  1771 ;       :  Get interval timer vector to prevent outside interrupts
                     0416  1772 ;       :  Get CHMK vector specifying service on IS
                     0416  1773 ;       :  Setup code to set done flag at loc 100
                     0416  1774 ;       :  Setup code to jump to RENTRY point in next loc
                     0416  1775 ;       :  Print restart instructions to operator
                     0416  1776 ;       :  Set ready to execute flag
                     0416  1777 ;       :  Execute CHMK to cause processor to HALT
                     0416  1778 ;       :  (this should cause a CHMK service on interrupt stack HALT)
                     0416  1779 ;       :  IF CHMK does not caues an exception
                     0416  1780 ;       :  :  THEN
                     0416  1781 ;       :  :  Set exception error flag
                     0416  1782 ;       :  ENDIF
                     0416  1783 ;       :  RENTRY point (restart enters here from exception)
                     0416  1784 ;       :  IF exception error flag set
                     0416  1785 ;       :  :  THEN
                     0416  1786 ;       :  :  Report CHMK exception error
                     0416  1787 ;       :  :  Exit test
                     0416  1788 ;       :  ENDIF
                     0416  1789 ;       :  IF CHMK instruction executed flag set
                     0416  1790 ;       :  :  THEN
                     0416  1791 ;       :  :  Report change mode error
                     0416  1792 ;       :  :  Exit test
                     0416  1793 ;       :  ENDIF
                     0416  1794 ;       :  IF done flag not set
                     0416  1795 ;       :  :  THEN
                     0416  1796 ;       :  :  Report done error
                     0416  1797 ;       :  :  Exit test
                     0416  1798 ;       :  ENDIF
                     0416  1799 ;       :  Read PSL
                     0416  1800 ;       :  IF IS not clear
                     0416  1801 ;       :  :  THEN
                     0416  1802 ;       :  :  Report incorrect stack error in clean up
                     0416  1803 ;       :  :  Exit test
                     0416  1804 ;       :  ENDIF
                     0416  1805 ;       :  Release interval timer vector
                     0416  1806 ;       :  Release CHMK vector
                     0416  1807 ;       ENDSUBTEST CHMK instruction with
                     0416  1808 ;
                     0416  1809 ;-
                     0416  1810          $DS_BGNSUB
                     0416          T5_S4::
00010030 9F   00000078'EF   FA   0416                  CALLG   $S$, a#DS$BGNSUB
              00000C2A'EF   16   0421  1811          JSB     CLEAR_BUFFER            ; clear data buffers
```

```
                0000003C'EF    D4  0427  1812          CLRL    L_FLAGS                         ; initialize flags
                                   042D  1813 1$:       $DS_SETVEC_S    VECTOR=#SCB$L_CHMK,SRVADR=CHMX_SERVICE,CODE=#0
                          00    DD  042D                    PUSHL   #0
                00000CC4'EF     DF  042F                    PUSHAL  CHMX_SERVICE
                00000040 8F     DD  0435                    PUSHL   #SCB$L_CHMK
             00010160 9F    03  FB  043B                    CALLS   #3, a#DS$SETVEC
                                   0442  1814
    00000100'EF 00000040'EF    7D  0442  1815 3$:       MOVQ    JUMP,RESTART                    ; setup code to renter after halt
    00000108'EF 00000048'EF    7D  044D  1816           MOVQ    JUMP+8,RESTART+8                ; load rest of rentry code
    00000004'EF 000004EF'EF    DE  0458  1817           MOVAL   RENTRY18,RENTRY_POINT           ; load rentry address
                                   0463  1818 4$:       $DS_PRINTF_S    FORMAT=T_INSTRUCTIONS,P0=#6$,P1=#CODE_0B
                          0B    DD  0463                    PUSHL   #CODE_0B
                000004E6'8F     DD  0465                    PUSHL   #6$
                000001DC'EF     9F  046B                    PUSHAB  T_INSTRUCTIONS
             000100F0 9F    03  FB  0471                    CALLS   #$$N, a#DS$PRINTF
                                   0478  1819           $DS_PRINTF_S    FORMAT=T_CONTINUE
                00000212'EF     9F  0478                    PUSHAB  T_CONTINUE
             000100F0 9F    01  FB  047E                    CALLS   #$$N, a#DS$PRINTF
    00000020'EF 00000000'EF    D0  0485  1820 5$:       MOVL    L_ISP,L_CUR_ISP                 ; save current IS SP
    00000000'EF 00000000'EF    D0  0490  1821           MOVL    L_KSP,L_EXP_SP                  ; load expected SP
    00000000'EF 00000000'EF    D0  049B  1822           MOVL    L_KSP,L_EXP_KSP                 ; load expected KSP
    00000000'EF 00000000'EF    D0  04A6  1823           MOVL    L_ISP,L_EXP_ISP                 ; load expected ISP
    00000000'EF 0000097F'EF    D0  04B1  1824           MOVL    DATA_1,L_EXP_PSL                ; load expected PSL
                00000C42'EF    16  04BC  1825           JSB     LOAD_GPR                        ; load GPR's with data
    00000030'EF 00000000'8F    DB  04C2  1826           MFPR    #PR$_SCBB,L_TEMP                ; load SCB base
    00000030'EF 00000040 8F    C0  04CD  1827           ADDL2   #SCB$L_CHMK,L_TEMP              ; offset of CHMK vector
          00000030'FF    01    C8  04D8  1828           BISL2   #1,aL_TEMP                      ; set service on inter. stack
          0000003C'EF    01    C8  04DF  1829           BISL2   #M_READY,L_FLAGS                ; set ready to execute flag
                   00    BC  04E6  1830 6$:       CHMK    #0                              ; execute change mode instruction
          0000003C'EF    04    C8  04E8  1831           BISL2   #M_EXECUTE_ERR,L_FLAGS          ; if no exception occurs will get here
                                   04EF  1832 RENTRY18:                                     ; will renter here when completed
          00000030'FF    01    CA  04EF  1833           BICL2   #1,aL_TEMP                      ; set service on inter. stack
       1C 00000000'EF    1A    E1  04F6  1834           BBC     #PSL$V_IS,L_ACT_PSL,9$          ; br = not on IS as expected
          5E   00000020'EF    D0  04FE  1835           MOVL    L_CUR_ISP,SP                    ; reset IS SP
          6E   0000050D'8F    D0  0505  1836           MOVL    #7$,(SP)                        ; setup return address
                   02    11  050C  1837           REI                                     ; get off interrupt stack
                   0B    11  050D  1838 7$:       BRB     9$                              ; skip IPR load
    00000000'8F    00000020'EF    DA  050F  1839 8$:       MTPR    L_CUR_ISP,#PR$_ISP              ; load IS SP into IPR
                00000CE5'EF    16  051A  1840 9$:       JSB     ERROR_CHECK                     ; check for errors (GPR's,AP,FP,PSL)
       2C 0000003C'EF    0C    E1  0520  1841           BBC     #V_ERROR_FLAG,L_FLAGS,10$       ; br = no errors
                                   0528  1842           $DS_ERRHARD_S   UNIT=KA_UNIT_NO, PRLINK=ERR_MESSAGE,P1=#T_CHMKSCB_ERR
                00000566'8F     DD  0528                    PUSHL   #T_CHMKSCB_ERR
                0000099B'EF     DF  052E                    PUSHAL  ERR_MESSAGE
                          00    DD  0534                    PUSHL   #0
                00000000'EF     DD  0536                    PUSHL   KA_UNIT_NO
                          01    DD  053C                    PUSHL   #$ER
                                   053E                ;;; TEST 5, SUBTEST 4, ERROR 1
             000100D0 9F    05  FB  053E                    CALLS   #$$M, a#DS$ERRHARD
       07 0000003C'EF    08    E1  0545  1843           BBC     #V_FATAL_ERR,L_FLAGS,10$ ; br = no fatal errors
                                   054D  1844           $DS_ABORT
          00010020 9F    6C    FA  054D                    CALLG   (AP), a#DS$ABORT
                                   0554  1845 10$:      $DS_CLRVEC_S    VECTOR=#SCB$L_CHMK
                00000040 8F     DD  0554                    PUSHL   #SCB$L_CHMK
          00010168 9F    01    FB  055A                    CALLS   #1, a#DS$CLRVEC
                                   0561  1846           $DS_ENDSUB
```

```
                        0561        T5_S4_X:
00010038 9F   00000078'EF   FA   0561                    CALLG   $S$, a#DS$ENDSUB
                        056C  1847          $DS_PAGE
                        056C  1848
```

```
                     056C                       .SBTTL  SUBTEST 5.5:  Invalid vector HALT
                     056C  1851 ;+
                     056C  1852 ; Subtest description:
                     056C  1853 ;
                     056C  1854 ;       This subtest checks that an XFC instruction with the SCB vector entry
                     056C  1855 ;       <1:0>=3 specifying an invalid vector will cause the processor to HALT
                     056C  1856 ;       (code = 7).
                     056C  1857 ;
                     056C  1858 ; Subtest steps:
                     056C  1859 ;
                     056C  1860 ;       SUBTEST Invalid vector HALT
                     056C  1861 ;       :  Initialize Flags
                     056C  1862 ;       :  Get interval timer vector to prevent outside interrupts
                     056C  1863 ;       :  Get XFC vector bits <1:0> = 3 (invalid vector)
                     056C  1864 ;       :  Setup code to set done flag at loc 100
                     056C  1865 ;       :  Setup code to jump to RENTRY point in next loc
                     056C  1866 ;       :  Print restart instructions to operator
                     056C  1867 ;       :  Set ready to execute flag
                     056C  1868 ;       :  Execute XFC to cause processor to HALT
                     056C  1869 ;       :  (this should cause a invalid vector HALT)
                     056C  1870 ;       :  IF XFC does not caues an exception
                     056C  1871 ;       :  :  THEN
                     056C  1872 ;       :  :  Set exception error flag
                     056C  1873 ;       :  ENDIF
                     056C  1874 ;       :  RENTRY point (restart enters here from exception)
                     056C  1875 ;       :  IF exception error flag set
                     056C  1876 ;       :  :  THEN
                     056C  1877 ;       :  :  Report XFC exception error
                     056C  1878 ;       :  :  Exit test
                     056C  1879 ;       :  ENDIF
                     056C  1880 ;       :  IF XFC instruction executed flag set
                     056C  1881 ;       :  :  THEN
                     056C  1882 ;       :  :  Report XFC error
                     056C  1883 ;       :  :  Exit test
                     056C  1884 ;       :  ENDIF
                     056C  1885 ;       :  IF done flag not set
                     056C  1886 ;       :  :  THEN
                     056C  1887 ;       :  :  Report done error
                     056C  1888 ;       :  :  Exit test
                     056C  1889 ;       :  ENDIF
                     056C  1890 ;       :  Read PSL
                     056C  1891 ;       :  IF IS not clear
                     056C  1892 ;       :  :  THEN
                     056C  1893 ;       :  :  Report incorrect stack error in clean up
                     056C  1894 ;       :  :  Exit test
                     056C  1895 ;       :  ENDIF
                     056C  1896 ;       :  Release interval timer vector
                     056C  1897 ;       :  Release XFC vector
                     056C  1898 ;       ENDSUBTEST Invalid vector HALT
                     056C  1899 ;
                     056C  1900 ;-
                     056C  1901                 $DS_BGNSUB
                     056C            T5_S5::
00010030 9F   00000084'EF   FA   056C                       CALLG   $S$, a#DS$BGNSUB
              00000C2A'EF   16   0577  1902          JSB     CLEAR_BUFFER                ; clear data buffers
```

```
                0000003C'EF   D4  057D  1903          CLRL    L_FLAGS                         ; initialize flags
                              0583  1904          $DS_SETVEC_S    VECTOR=#SCB$L_OPCCUS,SRVADR=XFC_ERROR,CODE=#3
                        03    DD  0583                      PUSHL   #3
                00000CCC'EF   DF  0585                      PUSHAL  XFC_ERROR
                        14    DD  058B                      PUSHL   #SCB$L_OPCCUS
            00010160 9F       03  FB  058D                      CALLS   #3, a#DS$SETVEC
    00000100'EF   00000040'EF   7D  0594  1905 3$:     MOVQ    JUMP,RESTART                    ; setup code to renter after halt
    00000108'EF   00000048'EF   7D  059F  1906         MOVQ    JUMP+8,RESTART+8                ; load rest of rentry code
    00000004'EF   0000062A'EF   DE  05AA  1907         MOVAL   RENTRY19,RENTRY_POINT           ; load rentry address
    00000030'EF   00000000'8F   DB  05B5  1908         MFPR    #PR$_SCBB,L_TEMP
            00000030'EF   14    C0  05C0  1909         ADDL2   #^X14,L_TEMP                    ; micro code will halt at SCBB+14
                              05C7  1910 4$:     $DS_PRINTF_S    FORMAT=T_INSTRUCTIONS,P0=L_TEMP,P1=#CODE_07
                        07    DD  05C7                      PUSHL   #CODE_07
                00000030'EF   DD  05C9                      PUSHL   L_TEMP
                000001DC'EF   9F  05CF                      PUSHAB  T_INSTRUCTIONS
            000100F0 9F       03  FB  05D5                      CALLS   #$$N, a#DS$PRINTF
                              05DC  1911         $DS_PRINTF_S    FORMAT=T_CONTINUE
                00000212'EF   9F  05DC                      PUSHAB  T_CONTINUE
            000100F0 9F       01  FB  05E2                      CALLS   #$$N, a#DS$PRINTF
    00000000'EF   00000000'EF   D0  05E9  1912 5$:     MOVL    L_KSP,L_EXP_SP                  ; load expected SP
    00000000'EF   00000000'EF   D0  05F4  1913         MOVL    L_KSP,L_EXP_KSP                 ; load expected KSP
    00000000'EF   00000000'EF   D0  05FF  1914         MOVL    L_ISP,L_EXP_ISP                 ; load expected ISP
    00000000'EF   0000097F'EF   D0  060A  1915         MOVL    DATA_1,L_EXP_PSL                ; load expected PSL
                00000C42'EF   16  0615  1916         JSB     LOAD_GPR                        ; load GPR's with data
            0000003C'EF       01  C8  061B  1917         BISL2   #M_READY,L_FLAGS                ; set ready to execute flag
                              FC  0622  1918 6$:     XFC                                     ; execute XFC to cause exception
            0000003C'EF       04  C8  0623  1919         BISL2   #M_EXECUTE_ERR,L_FLAGS          ; if no exception occurs will get here
                              062A  1920 RENTRY19:
        5E  00000000'EF       D0  062A  1921 9$:     MOVL    L_KSP,SP                        ; restore SP
                00000CE5'EF   16  0631  1922         JSB     ERROR_CHECK                     ; check for errors (GPR's,AP,FP,PSL)
      2C 0000003C'EF          0C  E1  0637  1923         BBC     #V_ERROR_FLAG,L_FLAGS,10$ ; br = no errors
                              063F  1924         $DS_ERRHARD_S   UNIT=KA_UNIT_NO, PRLINK=ERR_MESSAGE,P1=#T_SCB_ERR
                0000042D'8F   DD  063F                      PUSHL   #T_SCB_ERR
                0000099B'EF   DF  0645                      PUSHAL  ERR_MESSAGE
                        00    DD  064B                      PUSHL   #0
                00000000'EF   DD  064D                      PUSHL   KA_UNIT_NO
                        01    DD  0653                      PUSHL   #$ER
                              0655          ;;; TEST 5, SUBTEST 5, ERROR 1
            000100D0 9F       05  FB  0655                      CALLS   #$$M, a#DS$ERRHARD
      07 0000003C'EF          08  E1  065C  1925         BBC     #V_FATAL_ERR,L_FLAGS,10$ ; br = no fatal errors
                              0664  1926         $DS_ABORT
        00010020 9F       6C  FA  0664                      CALLG   (AP), a#DS$ABORT
                              066B  1927 10$:    $DS_CLRVEC_S    VECTOR=#SCB$L_OPCCUS
                        14    DD  066B                      PUSHL   #SCB$L_OPCCUS
        00010168 9F       01  FB  066D                      CALLS   #1, a#DS$CLRVEC
                              0674  1928         $DS_ENDSUB
                              0674      T5_S5_X:
00010038 9F   00000084'EF       FA  0674                      CALLG   $S$, a#DS$ENDSUB
                              067F  1929         $DS_CLRVEC_S    VECTOR=#SCB$L_TIMER
                000000C0 8F   DD  067F                      PUSHL   #SCB$L_TIMER
            00010168 9F       01  FB  0685                      CALLS   #1, a#DS$CLRVEC
                              068C  1930         $DS_PAGE
                     50   01  D0  068C                      MOVL    #1, R0                  ; NORMAL EXIT
                              068F      TEST_005_X::
            00010058 9F       6E  FA  068F                      CALLG   (SP), a#DS$BREAK
```

```
                 04  0696                          RET                         ; RETURN TO TEST SEQUENCER
                     0697  1932
                 00000000                           .PSECT  $TSTCNT, NOEXE, NOWRT, OVR, LONG
            00000005  0000                          .LONG   $TN
                     0004  1934          .END
```

```
$$$                     = 00000084 R     05        DS$ASKADR                       00010090
$$ARGS                  = 0000000A               DS$ASKDATA                      00010080
$$E                     = 00000001               DS$ASKLGCL                      00010098
$$M                     = 00000005               DS$ASKSTR                       000100A0
$$N                     = 00000001               DS$ASKVLD                       00010088
$$S                     = FFFFFFFF               DS$ATTACH                       000101A8
$$T1                    = 00000000               DS$BGNSUB                       00010030
$ENV                    = 00000001  G            DS$BRANCH                       000100A8
$ER                     = FFFFFFFF               DS$BREAK                        00010058
$MO                     = 00000001  G            DS$CANWAIT                      00010070
$S$                     = 00000084 R     05        DS$CHANNEL                      00010180
$ST                     = 00000000               DS$CKLOOP                       00010040
$TN                     = 00000005               DS$CLRVEC                       00010168
ALL                     = 00000009  G            DS$CNTRLC                       00010078
A_BUFFER_BEGIN             ********    X  03        DS$CVTREG                       000100B0
A_HALT_BUFFER              ********    X  01        DS$ENDPASS                      00010010
A_PSLMNE                   ********    X  01        DS$ENDSUB                       00010038
BASE_004                   00000000 R     03        DS$ERRDEV                       000100C8
BASE_005                   00000000 R     06        DS$ERRHARD                      000100D0
BUFSIZ                  = 00000080               DS$ERRPREP                      00010108
B_ANSWER                   00000000 R     01        DS$ERRSOFT                      000100D8
CEP_FUNCTIONAL          = 00000000               DS$ERRSYS                       000100C0
CEP_REPAIR              = 00000001               DS$ESCAPE                       00010050
CHMX_SERVICE               00000CC4 R     01        DS$FREEDBGSYM                   000101B8
CLEAR_BUFFER               00000C2A R     01        DS$GETBUF                       00010120
CLEAR_RPB                  00000BF8 R     01        DS$GETMEM                       00010130
CODE_00                 = 00000000               DS$GETTERM                      000101C8
CODE_02                 = 00000002               DS$GPHARD                       00010018
CODE_04                 = 00000004               DS$HELP                         000101B0
CODE_05                 = 00000005               DS$INITSCB                      00010170
CODE_06                 = 00000006               DS$INLOOP                       00010048
CODE_07                 = 00000007               DS$K_ERROR              = 00000002
CODE_08                 = 00000008               DS$K_NORMAL             = 00000001
CODE_0A                 = 0000000A               DS$K_SEVERE             = 00000004
CODE_0B                 = 0000000B               DS$K_SUBSYS             = 00000066
CODE_0C                 = 0000000C               DS$K_WARNING            = 00000000
CODE_0F                 = 0000000F               DS$LOAD                         00010198
CODE_11                 = 00000011               DS$LOADPCS                      000101C0
CODE_12                 = 00000012               DS$MAPDBGBLOCK                  00010118
CODE_13                 = 00000013               DS$MEMSIZE                      000101D8
CODE_14                 = 00000014               DS$MMOFF                        00010158
CODE_15                 = 00000015               DS$MMON                         00010150
CODE_16                 = 00000016               DS$MOVPHY                       00010148
CODE_FF                 = 000000FF               DS$MOVVRT                       00010140
DATA_004                   0000002C R     03        DS$PARSE                        000100B8
DATA_005                   00000024 R     06        DS$PRINTB                       000100E0
DATA_1                     0000097F R     01        DS$PRINTF                       000100F0
DATA_2                     00000983 R     01        DS$PRINTS                       000100F8
DATA_3                     00000987 R     01        DS$PRINTSIG                     00010100
DATA_4                     0000098B R     01        DS$PRINTX                       000100E8
DATA_5                     0000098F R     01        DS$PROBE                        000101A0
DATA_6                     00000993 R     01        DS$RELBUF                       00010128
DATA_7                     00000997 R     01        DS$RELMEM                       00010138
DEFAULT                 = 00000000  G            DS$SERVICE_DISPATCHER           000101D0
DS$ABORT                   00010020                 DS$SETIPL                       00010178
```

```
DS$SETMAP                       00010188
DS$SETPRIEXV                    00010110
DS$SETVEC                       00010160
DS$SHOCHAN                      00010190
DS$SUMMARY                      00010028
DS$WAITMS                       00010060
DS$WAITUS                       00010068
DS$_ARITH                   =   006600D0
DS$_ASBE                    =   00660118
DS$_BADLINK                 =   006600F0
DS$_BADTYPE                 =   006600E8
DS$_BIIC                    =   00660120
DS$_CHME                    =   006600A8
DS$_CHMK                    =   006600E0
DS$_DEVNAME                 =   00660108
DS$_ERROR                   =   00660002
DS$_FHWE                    =   00660068
DS$_FRAGBUF                 =   00660080
DS$_ICBUSY                  =   006600C8
DS$_ICERR                   =   006600C0
DS$_IHWE                    =   00660060
DS$_ILLCHAR                 =   00660018
DS$_ILLPAGCNT               =   00660078
DS$_ILLUNIT                 =   00660100
DS$_INSFMEM                 =   00660050
DS$_IPL2HI                  =   006600B8
DS$_IVADDR                  =   00660040
DS$_IVVECT                  =   00660038
DS$_KRNLSTK                 =   00660090
DS$_LOGIC                   =   00660070
DS$_MCHK                    =   00660088
DS$_MMOFF                   =   00660058
DS$_NEEDUNIT                =   006600F8
DS$_NODE                    =   00660128
DS$_NOPCS                   =   00660110
DS$_NORMAL                  =   00660001
DS$_NOSUPPORT               =   006600B1
DS$_NOTDON                  =   00660030
DS$_NOTIMP                  =   006600B0
DS$_NULLSTR                 =   00660010
DS$_OVERFLOW                =   00660008
DS$_POWER                   =   00660098
DS$_PROGERR                 =   00660020
DS$_SEVERE                  =   00660004
DS$_TRANSL                  =   006600A0
DS$_TRUNCATE                =   00660028
DS$_UNEXPINT                =   006600D8
DS$_VASFULL                 =   00660048
DS$_WARNING                 =   00660000
DSA$AL_APTMAIL                  0000FE00
DSA$AT_APTTXT                   0000FA00
DSA$GL_APTCOM                   0000FE04
DSA$GL_DEVLEN                   0000FE58
DSA$GL_ERRNO                    0000FE44
DSA$GL_EVENT                    0000FE48
DSA$GL_FLAGS                    0000FE00
DSA$GL_MSGTYP                   0000FE40
DSA$GL_PASSES                   0000FE08
DSA$GL_PASSNO                   0000FE54
DSA$GL_SECTNO                   0000FE10
DSA$GL_SID                      0000FE14
DSA$GL_SUBTNO                   0000FE4C
DSA$GL_TESTNO                   0000FE50
DSA$GL_UNITS                    0000FE0C
DSA$GQ_MSGPTR                   0000FE68
DSA$GT_DEVNAM                   0000FE5C
DSA$V_OPER                  =   0000000C
ENV$M_DOMAIN                =   00000002
ENV$M_LEVEL                 =   00000001
ENV$M_SUPER                 =   000003FC
ENV$S_DOMAIN                =   00000001
ENV$S_LEVEL                 =   00000001
ENV$S_SUPER                 =   00000008
ENV$V_DOMAIN                =   00000001
ENV$V_LEVEL                 =   00000000
ENV$V_SUPER                 =   00000002
ENV$_CPU                    =   00000000
ENV$_FUNCTIONAL             =   00000000
ENV$_REPAIR                 =   00000001
ENV$_SUPER                  =   00000001
ENV$_SYSTEM                 =   00000001
ERR$_MSGADR                 =   0000000C
ERR$_NARGS                  =   0000000A
ERR$_NUM                    =   00000004
ERR$_P1                     =   00000014
ERR$_P2                     =   00000018
ERR$_P3                     =   0000001C
ERR$_P4                     =   00000020
ERR$_P5                     =   00000024
ERR$_P6                     =   00000028
ERR$_POINTER                =   00000010
ERR$_UNIT                   =   00000008
ERROR_CHECK                     00000CE5 RG     01
ERR_MESSAGE                     0000099B R      01
GPR_TABLE                       ******** X      01
HALT                        =   00000004  G
IPR                         =   00000006  G
JUMP                            00000040 R      01
KA_UNIT_NO                  =   00000000
LOAD_GPR                        00000C42 R      01
L_ACT_ISP                       ******** X      01
L_ACT_KSP                       ******** X      01
L_ACT_PSL                       ******** X      01
L_ACT_SP                        ******** X      01
L_ADDRESS                       0000001C R      01
L_BNXM_ADR                  =   00E00000
L_COUNT                         00000018 R      01
L_CUR_ISP                       00000020 R      01
L_CUR_SCBB                      00000034 R      01
L_EXP_AP                        ******** X      01
```

```
L_EXP_FP                ********   X   01
L_EXP_ISP               ********   X   01
L_EXP_KSP               ********   X   01
L_EXP_MOD               00000024 R     01
L_EXP_PSL               ********   X   01
L_EXP_SP                ********   X   01
L_EXP_STACK             00000028 R     01
L_FLAGS                 0000003C R     01
L_ISP                   ********   X   03
L_KA_FLAGS              00000038 R     01
L_KSP                   ********   X   03
L_NXM_ADR             = 00500200
L_OLDPROT               0000002C R     01
L_PAGE0END              00000014 R     01
L_PAGEND                0000000C R     01
L_PAGESTRT              00000008 R     01
L_PAGEZERO              00000010 R     01
L_TEMP                  00000030 R     01
MANUAL                = 00000001   G
MCHK                  = 00000005   G
MODELIST                ********   X   01
MSG_004                 00000002 R     03
MSG_005                 00000002 R     06
M_BAD_MODE            = 00000040
M_BAD_STK             = 00000080
M_CHMX_ERR            = 00000008
M_DONE                = 00000002
M_ERROR_FLAG          = 00001000
M_EXECUTE_ERR         = 00000004
M_FATAL_ERR           = 00000100
M_GPR_ERR             = 00000400
M_ISP_ERR             = 00004000
M_ISTK                = 00010000
M_KSP_ERR             = 00002000
M_PSL_ERR             = 00000200
M_READY               = 00000001
M_SP_ERR              = 00008000
M_TIMER               = 00000020
M_XFC                 = 00000800
M_XFC_ERR             = 00000010
PCS                   = 00000008   G
POWER_FAIL            = 00000003   G
PR$_ICCS                ********   X   01
PR$_ISP                 ********   X   01
PR$_KSP                 ********   X   01
PR$_SCBB                ********   X   06
PRT$C_KR                ********   X   03
PRT$C_KW                ********   X   03
PSL$K_EXEC            = 00000001
PSL$K_KERNEL          = 00000000
PSL$K_SUPER           = 00000002
PSL$K_USER            = 00000003
PSL$M_CBIT            = 00000001
PSL$M_NBIT            = 00000008
PSL$M_VBIT            = 00000002
PSL$M_ZBIT            = 00000004
PSL$S_CURMOD          = 00000002
PSL$V_CBIT            = 00000000
PSL$V_CURMOD          = 00000018
PSL$V_IS              = 0000001A
PSL$V_NBIT            = 00000003
PSL$V_VBIT            = 00000001
PSL$V_ZBIT            = 00000002
READ_GPR                00000C6A R     01
REG_TABLE               ********   X   01
RENTRY1                 00000159 R     03
RENTRY10                000008EC R     03
RENTRY11                000009AD R     03
RENTRY12                00000A6C R     03
RENTRY13                00000B2D R     03
RENTRY15                0000013C R     06
RENTRY16                0000026E R     06
RENTRY17                000003A0 R     06
RENTRY18                000004EF R     06
RENTRY19                0000062A R     06
RENTRY2                 00000220 R     03
RENTRY3                 00000363 R     03
RENTRY4                 00000450 R     03
RENTRY5                 00000530 R     03
RENTRY6                 000005EC R     03
RENTRY7                 000006AD R     03
RENTRY8                 0000076C R     03
RENTRY9                 0000082D R     03
RENTRY_POINT            00000004 R     01
RESTART               = 00000100
SCB$L_ACCESS            00000020
SCB$L_ARITH             00000034
SCB$L_BREAK             0000002C
SCB$L_CHME              00000044
SCB$L_CHMK              00000040
SCB$L_CHMS              00000048
SCB$L_CHMU              0000004C
SCB$L_COMPAT            00000030
SCB$L_KNLSTK            00000008
SCB$L_MACHCHK           00000004
SCB$L_OPCCUS            00000014
SCB$L_OPCDEC            00000010
SCB$L_POWER             0000000C
SCB$L_RADRMOD           0000001C
SCB$L_ROPRAND           00000018
SCB$L_RXDB              000000F8
SCB$L_SFTLVL1           00000084
SCB$L_SFTLVL10          000000A8
SCB$L_SFTLVL11          000000AC
SCB$L_SFTLVL12          000000B0
SCB$L_SFTLVL13          000000B4
SCB$L_SFTLVL14          000000B8
SCB$L_SFTLVL15          000000BC
SCB$L_SFTLVL2           00000088
SCB$L_SFTLVL3           0000008C
```

```
SCB$L_SFTLVL4                   00000090                T4_S2_X                         0000040E R     03
SCB$L_SFTLVL5                   00000094                T4_S3                           00000419 RG    03
SCB$L_SFTLVL6                   00000098                T4_S3_X                         0000059A R     03
SCB$L_SFTLVL7                   0000009C                T4_S4                           000005A5 RG    03
SCB$L_SFTLVL8                   000000A0                T4_S4_X                         0000071D R     03
SCB$L_SFTLVL9                   000000A4                T4_S5                           00000728 RG    03
SCB$L_TBIT                      00000028                T4_S5_X                         0000089D R     03
SCB$L_TIMER                     000000C0                T4_S6                           000008A8 RG    03
SCB$L_TRANSL                    00000024                T4_S6_X                         00000A1D R     03
SCB$L_TXDB                      000000FC                T4_S7                           00000A28 RG    03
SCB$L_ZERO                      00000000                T4_S7_X                         00000B9D R     03
SEP_FUNCTIONAL                = 00000002                T5_S1                           00000080 RG    06
SEP_REPAIR                    = 00000003                T5_S1_X                         000001A7 R     06
SETUP_RPB                       00000C00 R      01      T5_S2                           000001B2 RG    06
SIZ...                        = 00000001                T5_S2_X                         000002D9 R     06
SYS$ALLOC                       00010238                T5_S3                           000002E4 RG    06
SYS$ASCTIM                      00010248                T5_S3_X                         0000040B R     06
SYS$ASSIGN                      00010250                T5_S4                           00000416 RG    06
SYS$BINTIM                      00010258                T5_S4_X                         00000561 R     06
SYS$CANCEL                      00010260                T5_S5                           0000056C RG    06
SYS$CANTIM                      00010268                T5_S5_X                         00000674 R     06
SYS$CLOSE                       000105B8                TEST_004                        00000030 RG    03
SYS$CLREF                       00010298                TEST_004_X                      00000BB8 RG    03
SYS$CONNECT                     000105C0                TEST_005                        00000028 RG    06
SYS$DALLOC                      000102D8                TEST_005_X                      0000068F RG    06
SYS$DASSGN                      000102E0                TIMER_SERVICE                   00000CB8 R     01
SYS$DISCONNECT                  000105D0                TU58                          = 00000002  G
SYS$FAO                         00010350                T_ACT_PSL                       000008E7 R     01
SYS$FAOL                        00010358                T_BAD_DATA                      000007D4 R     01
SYS$GET                         00010580                T_CHME_SCB_ERR                  0000052B R     01
SYS$GETCHN                      000104C8                T_CHME_ERR                      000003DD R     01
SYS$GETTIM                      00010378                T_CHMK_SCB_ERR                  00000566 R     01
SYS$LKWSET                      000103A0                T_CHMK_ERR                      00000405 R     01
SYS$NUMTIM                      000103B8                T_CHMS_SCB_ERR                  000004F0 R     01
SYS$OPEN                        00010608                T_CHMS_ERR                      000003B5 R     01
SYS$QIO                         000103C8                T_CHMU_SCB_ERR                  000004B5 R     01
SYS$QIOW                        00010200                T_CHMU_ERR                      0000038D R     01
SYS$READ                        00010590                T_CHMX_ERR                      0000065B R     01
SYS$READEF                      000103D0                T_CONTINUE                      00000212 R     01
SYS$SETAST                      000103F8                T_DBL_MCHK_ERR                  000000E6 R     01
SYS$SETEF                       00010400                T_EXECUTE                       00000601 R     01
SYS$SETIMR                      00010420                T_EXITING                       000001C7 R     01
SYS$SETPRI                      00010428                T_EXP_PSL                       000008C2 R     01
SYS$SETPRT                      00010430  G             T_GOOD_DATA                     000007FB R     01
SYS$SETRWM                      00010438                T_GPR                           00000929 R     01
SYS$SETSWM                      00010448                T_GPR_ERR                       000007AB R     01
SYS$ULKPAG                      00010460                T_HALT_ERR                      000002F1 R     01
SYS$ULWSET                      00010468                T_HALT_MESS                     000002C1 R     01
SYS$UNWIND                      00010470                T_INSTRUCTIONS                  000001DC R     01
SYS$WAITFR                      00010478                T_INVLDIS_ERR                   00000315 R     01
SYS$WFLAND                      00010488                T_ISP_ERR1                      00000715 R     01
SYS$WFLOR                       00010490                T_ISP_ERR2                      00000743 R     01
T4_S1                           00000088 RG     03      T_KSP_ERR1                      000006B9 R     01
T4_S1_X                         000001A0 R      03      T_KSP_ERR2                      000006E7 R     01
T4_S2                           000001AB RG     03      T_NOT_DONE                      000005D3 R     01
```

```
T_NOT_ON_IS                     0000089B R      01
T_NOT_ON_KS                     00000877 R      01
T_NOT_READY                     000005A1 R      01
T_NOXOR                         0000096B R      01
T_NO_OPER                       0000004D R      01
T_NXMIS_ERR                     00000350 R      01
T_NXM_WCS_ERR                   00000124 R      01
T_PAGEOPROT                     00000816 R      01
T_PAGEPROT                      00000844 R      01
T_PSL                           0000090C R      01
T_REST_OFF                      00000197 R      01
T_SCBBNXM_ERR                   0000015B R      01
T_SCB_ERR                       0000042D R      01
T_SP_ERR1                       00000771 R      01
T_SP_ERR2                       0000079F R      01
T_TIMER                         00000691 R      01
T_WARNING                       00000262 R      01
T_WCS_ERR                       00000463 R      01
T_XFC                           00000626 R      01
T_XOR                           00000951 R      01
V_BAD_MODE                    = 00000006
V_BAD_STK                     = 00000007
V_CHMX_ERR                    = 00000003
V_DONE                        = 00000001
V_ERROR_FLAG                  = 0000000C
V_EXECUTE_ERR                 = 00000002
V_FATAL_ERR                   = 00000008
V_GPR_ERR                     = 0000000A
V_ISP_ERR                     = 0000000E
V_ISTK                        = 00000010
V_KSP_ERR                     = 0000000D
V_PSL_ERR                     = 00000009
V_READY                       = 00000000
V_SP_ERR                      = 0000000F
V_TIMER                       = 00000005
V_USR_WCS                     = 00000019
V_XFC                         = 0000000B
V_XFC_ERR                     = 00000004
WCS                           = 00000007  G
XFC_ERROR                       00000CCC R      01
XFC_SERVICE                     00000CD8 R      01
```

+----------------+
! Psect synopsis !
+----------------+

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
ECKAXD	00000E0D (3597.)	01 (1.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC LONG
ABS	00010610 (67088.)	02 (2.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE
TEST_004	00000BC0 (3008.)	03 (3.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
DISPATCH	00000030 (48.)	04 (4.)	NOPIC USR CON REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG
ARGLIST	00000090 (144.)	05 (5.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC LONG
TEST_005	00000697 (1687.)	06 (6.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE

```
$TSTCNT                         00000004  (    4.)  07 (  7.)  NOPIC   USR   OVR   REL   LCL NOSHR NOEXE   RD  NOWRT NOVEC LONG
```

Symbol Cross Reference

SYMBOL	VALUE	DEFINITION	REFERENCES...
$$$	=00000084-R	1901 (20)	1057 (11) 1177 (12) 1295 (13) 1414 (14) 1552 (16) 1638 (17) 1724 (18) 1810 (19) 1901 (20) 670 (8) 794 (9) 934 (10)
$$ARGS	=0000000A	90 (2)	90 (2)
$$E	=00000001	1901 (20)	1103 (11) 1223 (12) 1341 (13) 1460 (14) 1584 (16) 1670 (17) 1756 (18) 1846 (19) 1928 (20) 704 (8) 867 (9) 988 (10)
$$M	=00000005	1924 (20)	1070 (11) 1098 (11) 1190 (12) 1218 (12) 1308 (13) 1336 (13) 1427 (14) 1455 (14) 1486 (15) 1580 (16) 1666 (17) 1752 (18) 1842 (19) 1924 (20) 611 (7) 699 (8) 802 (9) 810 (9) 829 (9) 857 (9) 863 (9) 945 (10) 983 (10)
$$N	=00000001	1924 (20)	1070 (11) 1078 (11) #-1079 (11) 1098 (11) 1190 (12) 1198 (12) #-1199 (12) 1218 (12) 1308 (13) 1316 (13) #-1317 (13) 1336 (13) 1427 (14) 1435 (14) #-1436 (14) 1455 (14) #-1488 (15) #-1491 (15) 1560 (16) #-1561 (16) 1580 (16) 1646 (17) #-1647 (17) 1666 (17) 1732 (18) #-1733 (18) 1752 (18) 1818 (19) #-1819 (19) 1842 (19) 1910 (20) #-1911 (20) 1924 (20) #-370 (5) #-371 (5) #-373 (5) #-375 (5) #-377 (5) #-379 (5) #-381 (5) 384 (5) 386 (5) 389 (5) 391 (5) 393 (5) 395 (5) 401 (5) 405 (5) 410 (5) #-412 (5) 420 (5) 422 (5) #-425 (5) #-613 (7) #-615 (7) 680 (8) #-681 (8) 699 (8) 802 (9) 810 (9) 821 (9) #-822 (9) 829 (9) 857 (9) 863 (9) 945 (10) 95 (2) 957 (10) #-958 (10) 983 (10)
$$S	=FFFFFFFF	1931 (20)	1057 (11) 1107 (12) 1177 (12) 1226 (13) 1295 (13) 1344 (14) 1414 (14) 1467 (15) 1486 (15) 1501 (16) 1552 (16) 1587 (17) 1638 (17) 1673 (18) 1724 (18) 1759 (19) 1810 (19) 1850 (20) 1901 (20) 598 (7) 611 (7) 623 (8) 670 (8) 707 (9) 794 (9) 870 (10) 934 (10) 991 (11)
$$T1	=00000000	861 (9)	800 (9) 827 (9) 861 (9) 90 (2)
$ENV	=00000001	73 (2)	
$ER	=FFFFFFFF	1931 (20)	1057 (11) #-1070 (11) #-1098 (11) 1177 (12) #-1190 (12) #-1218 (12) 1295 (13) #-1308 (13) #-1336 (13) 1414 (14) #-1427 (14) #-1455 (14) 1552 (16) #-1580 (16) 1638 (17) #-1666 (17) 1724 (18) #-1752 (18) 1810 (19) #-1842 (19) 1901 (20) #-1924 (20) 670 (8) #-699 (8) 794 (9) #-802 (9) #-810 (9) #-829 (9) #-857 (9) #-863 (9) 934 (10) #-945 (10)

```
                                                  #-983    (10)
$MO                 =00000001     1933   (20)     1933    (20)
$S$                 =00000084-R   1901   (20)     1057    (11)     1103    (11)     1177    (12)     1223    (12)
                                                   1295    (13)     1341    (13)     1414    (14)     1460    (14)
                                                   1552    (16)     1584    (16)     1638    (17)     1670    (17)
                                                   1724    (18)     1756    (18)     1810    (19)     1846    (19)
                                                   1901    (20)     1928    (20)     670     (8)      704     (8)
                                                   794     (9)      867     (9)      934     (10)     988     (10)
$ST                 =00000000     1931   (20)     1057    (11)     1070    (11)     1098    (11)     1103    (11)
                                                   1107    (12)     1177    (12)     1190    (12)     1218    (12)
                                                   1223    (12)     1226    (13)     1295    (13)     1308    (13)
                                                   1336    (13)     1341    (13)     1344    (14)     1414    (14)
                                                   1427    (14)     1455    (14)     1460    (14)     1462    (14)
                                                   1486    (15)     1501    (16)     1552    (16)     1580    (16)
                                                   1584    (16)     1587    (17)     1638    (17)     1666    (17)
                                                   1670    (17)     1673    (18)     1724    (18)     1752    (18)
                                                   1756    (18)     1759    (19)     1810    (19)     1842    (19)
                                                   1846    (19)     1850    (20)     1901    (20)     1924    (20)
                                                   1928    (20)     1931    (20)     611     (7)      623     (8)
                                                   670     (8)      699     (8)      704     (8)      707     (9)
                                                   794     (9)      802     (9)      810     (9)      829     (9)
                                                   857     (9)      863     (9)      867     (9)      870     (10)
                                                   934     (10)     945     (10)     983     (10)     988     (10)
                                                   991     (11)
$TN                 =00000005     1933   (20)     1070    (11)     1098    (11)     1107    (12)     1190    (12)
                                                   1218    (12)     1226    (13)     1308    (13)     1336    (13)
                                                   1344    (14)     1427    (14)     1455    (14)     1462    (14)
                                                   1467    (15)     1486    (15)     1501    (16)     1580    (16)
                                                   1587    (17)     1666    (17)     1673    (18)     1752    (18)
                                                   1759    (19)     1842    (19)     1850    (20)     1924    (20)
                                                   1931    (20)     1933    (20)     598     (7)      611     (7)
                                                   623     (8)      699     (8)      707     (9)      810     (9)
                                                   857     (9)      870     (10)     945     (10)     983     (10)
                                                   991     (11)
ALL                 =00000009     95     (2)      1486    (15)     611     (7)
A_BUFFER_BEGIN       00000000-XR                 #-823    (9)
A_HALT_BUFFER        00000000-XR                 #-414    (5)      461     (6)     #-488    (6)     #-489    (6)
                                                  #-550    (6)
A_PSLMNE             00000000-XR                  400     (5)      404     (5)      409     (5)
BASE_004             00000000-R    598    (7)      611     (7)
BASE_005             00000000-R    1467   (15)     1486    (15)
BIT...              =00000003     92     (2)      73      (2)      89      (2)      92      (2)
BUFSIZ              =00000080     175    (2)     #-368    (5)     #-400    (5)     #-404    (5)     #-409    (5)
B_ANSWER             00000000-R    98     (2)
CEP_FUNCTIONAL      =00000000     73     (2)
CEP_REPAIR          =00000001     73     (2)      73      (2)
CHMX_SERVICE         00000CC4-R    519    (6)      1062    (11)     1182    (12)     1300    (13)     1419    (14)
                                                   1555    (16)     1641    (17)     1727    (18)     1813    (19)
CLEAR_BUFFER         00000C2A-R    460    (6)      1059    (11)     1179    (12)     1297    (13)     1416    (14)
                                                   1496    (15)     1553    (16)     1639    (17)     1725    (18)
                                                   1811    (19)     1902    (20)     618     (7)      672     (8)
                                                   796     (9)      936     (10)
CLEAR_RPB            00000BF8-R    435    (6)      1058    (11)     1178    (12)     1296    (13)     1415    (14)
                                                   671     (8)      795     (9)      935     (10)
CODE_00             =00000000     156    (2)
```

```
CODE_02                         =00000002     157     (2)
CODE_04                         =00000004     158     (2)     #-821    (9)    #-957    (10)
CODE_05                         =00000005     159     (2)
CODE_06                         =00000006     160     (2)     #-680    (8)
CODE_07                         =00000007     161     (2)     #-1910   (20)
CODE_08                         =00000008     162     (2)
CODE_0A                         =0000000A     163     (2)     #-1078   (11)   #-1198   (12)   #-1316   (13)   #-1435   (14)
CODE_0B                         =0000000B     164     (2)     #-1560   (16)   #-1646   (17)   #-1732   (18)   #-1818   (19)
CODE_0C                         =0000000C     165     (2)
CODE_0F                         =0000000F     166     (2)
CODE_11                         =00000011     167     (2)
CODE_12                         =00000012     168     (2)
CODE_13                         =00000013     169     (2)
CODE_14                         =00000014     170     (2)
CODE_15                         =00000015     171     (2)
CODE_16                         =00000016     172     (2)
CODE_FF                         =000000FF     173     (2)
DATA_004                         0000002C-R   611     (7)      611    (7)
DATA_005                         00000024-R   1486    (15)     1486   (15)
DATA_1                           0000097F-R   350     (5)     #-1566   (16)   #-1652   (17)   #-1738   (18)   #-1824   (19)
                                                             #-1915   (20)   #-685    (8)    #-688    (8)
DATA_2                           00000983-R   352     (5)     #-835    (9)
DATA_3                           00000987-R   354     (5)     #-962    (10)
DATA_4                           0000098B-R   356     (5)     #-1084   (11)   #-1204   (12)   #-1322   (13)   #-1441   (14)
DATA_5                           0000098F-R   358     (5)
DATA_6                           00000993-R   360     (5)
DATA_7                           00000997-R   362     (5)
DEFAULT                         =00000000     95      (2)
DS$ABORT                         00010020                1071   (11)   1100   (11)   1191   (12)   1220   (12)
                                                         1309   (13)   1338   (13)   1428   (14)   1457   (14)
                                                         1489   (15)   1582   (16)   1668   (17)   1754   (18)
                                                         1844   (19)   1926   (20)   614    (7)    701    (8)
                                                         703    (8)    803    (9)    811    (9)    830    (9)
                                                         858    (9)    860    (9)    864    (9)    946    (10)
                                                         985    (10)
DS$BGNSUB                        00010030                1057   (11)   1177   (12)   1295   (13)   1414   (14)
                                                         1552   (16)   1638   (17)   1724   (18)   1810   (19)
                                                         1901   (20)   670    (8)    794    (9)    934    (10)
DS$BREAK                         00010058                1462   (14)   1931   (20)
DS$CLRVEC                        00010168                1101   (11)   1102   (11)   1221   (12)   1222   (12)
                                                         1339   (13)   1340   (13)   1458   (14)   1459   (14)
                                                         1461   (14)   1583   (16)   1669   (17)   1755   (18)
                                                         1845   (19)   1927   (20)   1929   (20)   812    (9)
                                                         866    (9)    947    (10)   987    (10)
DS$CVTREG                        000100B0                400    (5)    404    (5)    409    (5)
DS$ENDSUB                        00010038                1103   (11)   1223   (12)   1341   (13)   1460   (14)
                                                         1584   (16)   1670   (17)   1756   (18)   1846   (19)
                                                         1928   (20)   704    (8)    867    (9)    988    (10)
DS$ERRHARD                       000100D0                1070   (11)   1098   (11)   1190   (12)   1218   (12)
                                                         1308   (13)   1336   (13)   1427   (14)   1455   (14)
                                                         1580   (16)   1666   (17)   1752   (18)   1842   (19)
                                                         1924   (20)   699    (8)    810    (9)    857    (9)
                                                         945    (10)   983    (10)
DS$ERRSYS                        000100C0                802    (9)    829    (9)    863    (9)
DS$K_ERROR                      =00000002     89      (2)
```

```
DS$K_NORMAL                     =00000001     89     (2)
DS$K_SEVERE                     =00000004     89     (2)
DS$K_SUBSYS                     =00000066     89     (2)     89     (2)
DS$K_WARNING                    =00000000     89     (2)
DS$MMOFF                         00010158                   865    (9)     986    (10)
DS$MMON                          00010150                   799    (9)     938    (10)
DS$PRINTB                        000100E0                   370    (5)     371    (5)     373    (5)     375    (5)
                                                            377    (5)     379    (5)     381    (5)     384    (5)
                                                            389    (5)     393    (5)     401    (5)     405    (5)
                                                            412    (5)     420    (5)     425    (5)
DS$PRINTF                        000100F0                   1078   (11)    1079   (11)    1198   (12)    1199   (12)
                                                            1316   (13)    1317   (13)    1435   (14)    1436   (14)
                                                            1488   (15)    1491   (15)    1560   (16)    1561   (16)
                                                            1646   (17)    1647   (17)    1732   (18)    1733   (18)
                                                            1818   (19)    1819   (19)    1910   (20)    1911   (20)
                                                            613    (7)     615    (7)     680    (8)     681    (8)
                                                            821    (9)     822    (9)     957    (10)    958    (10)
DS$PRINTX                        000100E8                   386    (5)     391    (5)     395    (5)     410    (5)
                                                            422    (5)
DS$SETVEC                        00010160                   1061   (11)    1062   (11)    1181   (12)    1182   (12)
                                                            1299   (13)    1300   (13)    1418   (14)    1419   (14)
                                                            1497   (15)    1555   (16)    1641   (17)    1727   (18)
                                                            1813   (19)    1904   (20)    619    (7)     804    (9)
                                                            813    (9)     939    (10)    949    (10)
DS$_ARITH                       =006600D0     89     (2)
DS$_ASBE                        =00660118     89     (2)
DS$_BADLINK                     =006600F0     89     (2)
DS$_BADTYPE                     =006600E8     89     (2)
DS$_BIIC                        =00660120     89     (2)
DS$_CHME                        =006600A8     89     (2)
DS$_CHMK                        =006600E0     89     (2)
DS$_DEVNAME                     =00660108     89     (2)
DS$_ERROR                       =00660002     89     (2)
DS$_FHWE                        =00660068     89     (2)
DS$_FRAGBUF                     =00660080     89     (2)
DS$_ICBUSY                      =006600C8     89     (2)
DS$_ICERR                       =006600C0     89     (2)
DS$_IHWE                        =00660060     89     (2)
DS$_ILLCHAR                     =00660018     89     (2)
DS$_ILLPAGCNT                   =00660078     89     (2)
DS$_ILLUNIT                     =00660100     89     (2)
DS$_INSFMEM                     =00660050     89     (2)
DS$_IPL2HI                      =006600B8     89     (2)
DS$_IVADDR                      =00660040     89     (2)
DS$_IVVECT                      =00660038     89     (2)
DS$_KRNLSTK                     =00660090     89     (2)
DS$_LOGIC                       =00660070     89     (2)
DS$_MCHK                        =00660088     89     (2)
DS$_MMOFF                       =00660058     89     (2)
DS$_NEEDUNIT                    =006600F8     89     (2)
DS$_NODE                        =00660128     89     (2)
DS$_NOPCS                       =00660110     89     (2)
DS$_NORMAL                      =00660001     89     (2)
DS$_NOSUPPORT                   =006600B1     89     (2)
DS$_NOTDON                      =00660030     89     (2)
```

```
DS$_NOTIMP                      =006600B0     89      (2)       89      (2)
DS$_NULLSTR                     =00660010     89      (2)
DS$_OVERFLOW                    =00660008     89      (2)
DS$_POWER                       =00660098     89      (2)
DS$_PROGERR                     =00660020     89      (2)
DS$_SEVERE                      =00660004     89      (2)
DS$_TRANSL                      =006600A0     89      (2)
DS$_TRUNCATE                    =00660028     89      (2)
DS$_UNEXPINT                    =006600D8     89      (2)
DS$_VASFULL                     =00660048     89      (2)
DS$_WARNING                     =00660000     89      (2)       89      (2)
DSA$GL_FLAGS                     0000FE00                       1075    (11)     1195    (12)     1313    (13)     1432    (14)
                                                                1487    (15)      612    (7)       677    (8)      687    (8)
                                                                818     (9)       954    (10)
DSA$V_OPER                      =0000000C                     #-1075    (11)   #-1195    (12)   #-1313    (13)   #-1432    (14)
                                                              #-1487    (15)   #-612     (7)    #-677     (8)    #-687     (8)
                                                              #-818     (9)    #-954     (10)
ENV$M_DOMAIN                    =00000002     73      (2)
ENV$M_LEVEL                     =00000001     73      (2)
ENV$M_SUPER                     =000003FC     73      (2)
ENV$S_DOMAIN                    =00000001     73      (2)
ENV$S_LEVEL                     =00000001     73      (2)
ENV$S_SUPER                     =00000008     73      (2)
ENV$V_DOMAIN                    =00000001     73      (2)       73      (2)
ENV$V_LEVEL                     =00000000     73      (2)       73      (2)
ENV$V_SUPER                     =00000002     73      (2)
ENV$_CPU                        =00000000     73      (2)       73      (2)
ENV$_FUNCTIONAL                 =00000000     73      (2)       73      (2)
ENV$_REPAIR                     =00000001     73      (2)       73      (2)
ENV$_SUPER                      =00000001     73      (2)
ENV$_SYSTEM                     =00000001     73      (2)       73      (2)
ERR$_MSGADR                     =0000000C     90      (2)
ERR$_NARGS                      =0000000A     90      (2)
ERR$_NUM                        =00000004     90      (2)
ERR$_P1                         =00000014     90      (2)       371     (5)
ERR$_P2                         =00000018     90      (2)
ERR$_P3                         =0000001C     90      (2)
ERR$_P4                         =00000020     90      (2)
ERR$_P5                         =00000024     90      (2)
ERR$_P6                         =00000028     90      (2)
ERR$_POINTER                    =00000010     90      (2)
ERR$_UNIT                       =00000008     90      (2)
ERROR_CHECK                      00000CE5-R   547     (6)       1096    (11)     1216    (12)     1334    (13)     1453    (14)
                                                                1578    (16)     1664    (17)     1750    (18)     1840    (19)
                                                                1922    (20)      697    (8)       855    (9)      981    (10)
ERR_MESSAGE                      0000099B-R   366     (5)       1098    (11)     1218    (12)     1336    (13)     1455    (14)
                                                                1580    (16)     1666    (17)     1752    (18)     1842    (19)
                                                                1924    (20)      699    (8)       857    (9)      983    (10)
GPR_TABLE                        00000000-XR                    413     (5)       471    (6)       551    (6)
HALT                            =00000004     95      (2)       1486    (15)      611    (7)
IPR                             =00000006     95      (2)
JUMP                             00000040-R   178     (2)     #-1072    (11)   #-1073    (11)   #-1192    (12)   #-1193    (12)
                                                              #-1310    (13)   #-1311    (13)   #-1429    (14)   #-1430    (14)
                                                              #-1557    (16)   #-1558    (16)   #-1643    (17)   #-1644    (17)
                                                              #-1729    (18)   #-1730    (18)   #-1815    (19)   #-1816    (19)
```

```
                                                #-1905  (20)  #-1906  (20)  #-674   (8)  #-675   (8)
                                                #-814   (9)   #-815   (9)   #-950   (10)  #-951   (10)
KA_UNIT_NO                  =00000000    117 (2)  #-1580  (16)  #-1666  (17)  #-1752  (18)  #-1842  (19)
                                                #-1924  (20)
LOAD_GPR                    00000C42-R   470 (6)    1085  (11)    1205  (12)    1323  (13)    1442  (14)
                                                  1567  (16)    1653  (17)    1739  (18)    1825  (19)
                                                  1916  (20)     686  (8)      837  (9)      963  (10)
L_ACT_ISP                   00000000-XR          #-389   (5)   #-391   (5)   #-500   (6)  #-565   (6)
L_ACT_KSP                   00000000-XR          #-384   (5)   #-386   (5)   #-499   (6)  #-561   (6)
L_ACT_PSL                   00000000-XR          #-1068  (11)    1069  (11)    1090  (11)  #-1188  (12)
                                                  1189  (12)    1210  (12)  #-1306  (13)    1307  (13)
                                                  1328  (13)  #-1425  (14)    1426  (14)    1447  (14)
                                                  1572  (16)    1658  (17)    1744  (18)    1834  (19)
                                                #-404   (5)   #-405   (5)   #-501   (6)     559  (6)
                                                #-568   (6)     573  (6)     578  (6)   #-808   (9)
                                                  809  (9)      849  (9)   #-943   (10)    944  (10)
                                                  974  (10)
L_ACT_SP                    00000000-XR          #-393   (5)   #-395   (5)   #-498   (6)  #-556   (6)
L_ADDRESS                   0000001C-R   106 (2)  #-823   (9)   #-824   (9)   #-825   (9)  #-826   (9)
                                                #-832   (9)   #-839   (9)
L_BNXM_ADR                  =00E00000    153 (2)
L_COUNT                     00000018-R   105 (2)  #-451   (6)   #-453   (6)   #-462   (6)  #-464   (6)
L_CUR_ISP                   00000020-R   107 (2)  #-1080  (11)  #-1091  (11)  #-1095  (11)  #-1200  (12)
                                                #-1211  (12)  #-1215  (12)  #-1318  (13)  #-1329  (13)
                                                #-1333  (13)  #-1437  (14)  #-1448  (14)  #-1452  (14)
                                                #-1562  (16)  #-1573  (16)  #-1577  (16)  #-1648  (17)
                                                #-1659  (17)  #-1663  (17)  #-1734  (18)  #-1745  (18)
                                                #-1749  (18)  #-1820  (19)  #-1835  (19)  #-1839  (19)
                                                #-817   (9)   #-850   (9)   #-854   (9)  #-953   (10)
                                                #-975   (10)  #-979   (10)
L_CUR_SCBB                  00000034-R   112 (2)
L_EXP_AP                    00000000-XR          #-478   (6)   #-689   (8)
L_EXP_FP                    00000000-XR          #-479   (6)
L_EXP_ISP                   00000000-XR          #-1083  (11)  #-1203  (12)  #-1321  (13)  #-1440  (14)
                                                #-1565  (16)  #-1651  (17)  #-1737  (18)  #-1823  (19)
                                                #-1914  (20)  #-389   (5)   #-565   (6)  #-684   (8)
                                                #-834   (9)   #-961   (10)
L_EXP_KSP                   00000000-XR          #-1082  (11)  #-1202  (12)  #-1320  (13)  #-1439  (14)
                                                #-1564  (16)  #-1650  (17)  #-1736  (18)  #-1822  (19)
                                                #-1913  (20)  #-384   (5)   #-561   (6)  #-683   (8)
                                                #-833   (9)   #-960   (10)
L_EXP_MOD                   00000024-R   108 (2)  #-571   (6)   #-573   (6)
L_EXP_PSL                   00000000-XR          #-1084  (11)  #-1204  (12)  #-1322  (13)  #-1441  (14)
                                                #-1566  (16)  #-1652  (17)  #-1738  (18)  #-1824  (19)
                                                #-1915  (20)  #-400   (5)   #-401   (5)  #-409   (5)
                                                #-410   (5)   #-568   (6)     571  (6)     576  (6)
                                                #-685   (8)   #-688   (8)   #-835   (9)  #-962   (10)
L_EXP_SP                    00000000-XR          #-1081  (11)  #-1201  (12)  #-1319  (13)  #-1438  (14)
                                                #-1563  (16)  #-1649  (17)  #-1735  (18)  #-1821  (19)
                                                #-1912  (20)  #-393   (5)   #-556   (6)  #-682   (8)
                                                #-690   (8)   #-832   (9)   #-959   (10)
L_EXP_STACK                 00000028-R   109 (2)  #-576   (6)   #-578   (6)
L_FLAGS                     0000003C-R   115 (2)  #-1060  (11)  #-1086  (11)  #-1088  (11)    1097  (11)
                                                  1099  (11)  #-1180  (12)  #-1206  (12)  #-1208  (12)
                                                  1217  (12)    1219  (12)  #-1298  (13)  #-1324  (13)
```

```
                                                  #-1326  (13)    1335  (13)    1337  (13)  #-1417  (14)
                                                  #-1443  (14)  #-1445  (14)    1454  (14)    1456  (14)
                                                  #-1554  (16)  #-1568  (16)  #-1570  (16)    1579  (16)
                                                    1581  (16)  #-1640  (17)  #-1654  (17)  #-1656  (17)
                                                    1665  (17)    1667  (17)  #-1726  (18)  #-1740  (18)
                                                  #-1742  (18)    1751  (18)    1753  (18)  #-178   (2)
                                                  #-1812  (19)  #-1829  (19)  #-1831  (19)    1841  (19)
                                                    1843  (19)  #-1903  (20)  #-1917  (20)  #-1919  (20)
                                                    1923  (20)    1925  (20)     372   (5)     374   (5)
                                                     376   (5)     378   (5)     380   (5)     382   (5)
                                                     383   (5)     387   (5)     388   (5)     392   (5)
                                                     396   (5)     411   (5)     424   (5)  #-511   (6)
                                                  #-520   (6)  #-529   (6)  #-538   (6)  #-554   (6)
                                                  #-558   (6)  #-560   (6)  #-563   (6)     564   (6)
                                                  #-567   (6)  #-580   (6)  #-581   (6)     582   (6)
                                                  #-583   (6)     584   (6)  #-585   (6)     586   (6)
                                                  #-587   (6)     588   (6)  #-589   (6)     590   (6)
                                                  #-591   (6)     592   (6)  #-593   (6)  #-673   (8)
                                                  #-691   (8)  #-694   (8)     698   (8)     702   (8)
                                                  #-797   (9)  #-838   (9)  #-845   (9)     856   (9)
                                                    859   (9)  #-937  (10)  #-965  (10)  #-970  (10)
                                                     982  (10)     984  (10)
L_ISP                    00000000-XR              #-1081  (11)  #-1201  (12)  #-1319  (13)  #-1438  (14)
                                                  #-1495  (15)  #-1562  (16)  #-1565  (16)  #-1648  (17)
                                                  #-1651  (17)  #-1734  (18)  #-1737  (18)  #-1820  (19)
                                                  #-1823  (19)  #-1914  (20)  #-617   (7)  #-684   (8)
L_KA_FLAGS               00000038-R   113   (2)
L_KSP                    00000000-XR              #-1082  (11)  #-1202  (12)  #-1320  (13)  #-1439  (14)
                                                  #-1494  (15)  #-1563  (16)  #-1564  (16)  #-1649  (17)
                                                  #-1650  (17)  #-1735  (18)  #-1736  (18)  #-1821  (19)
                                                  #-1822  (19)  #-1912  (20)  #-1913  (20)  #-1921  (20)
                                                  #-616   (7)  #-682   (8)  #-696   (8)  #-833   (9)
                                                  #-960  (10)
L_NXM_ADR                =00500200    152   (2)
L_OLDPROT                 0000002C-R  110   (2)    827   (9)    861   (9)
L_PAGE0END               00000014-R   103   (2)
L_PAGEND                  0000000C-R  101   (2)  #-825   (9)
L_PAGESTRT               00000008-R   100   (2)  #-824   (9)    827   (9)    861   (9)
L_PAGEZERO               00000010-R   102   (2)  #-798   (9)    800   (9)
L_TEMP                   00000030-R   111   (2)  #-1826  (19)  #-1827  (19)  #-1828  (19)  #-1833  (19)
                                                  #-1908  (20)  #-1909  (20)  #-1910  (20)
MANUAL                   =00000001    95    (2)   1486  (15)    611   (7)
MCHK                     =00000005    95    (2)
MODELIST                  00000000-XR              400   (5)    404   (5)    409   (5)
MSG_004                   00000002-R  598   (7)    611   (7)
MSG_005                   00000002-R  1467  (15)   1486  (15)
M_BAD_MODE               =00000040    131   (2)
M_BAD_STK                =00000080    133   (2)
M_CHMX_ERR               =00000008    125   (2)  #-520   (6)
M_DONE                   =00000002    121   (2)  #-178   (2)
M_ERROR_FLAG             =00001000    143   (2)  #-554   (6)  #-558   (6)  #-563   (6)  #-567   (6)
                                                  #-581   (6)  #-583   (6)  #-585   (6)  #-587   (6)
                                                  #-589   (6)  #-591   (6)  #-593   (6)
M_EXECUTE_ERR            =00000004    123   (2)  #-1088  (11)  #-1208  (12)  #-1326  (13)  #-1445  (14)
                                                  #-1570  (16)  #-1656  (17)  #-1742  (18)  #-1831  (19)
```

```
                                                        #-1919  (20)   #-694   (8)   #-845   (9)   #-970   (10)
M_FATAL_ERR                =00000100     135   (2)      #-580   (6)
M_GPR_ERR                  =00000400     139   (2)      #-554   (6)
M_ISP_ERR                  =00004000     147   (2)      #-567   (6)
M_ISTK                     =00010000     151   (2)      #-560   (6)
M_KSP_ERR                  =00002000     145   (2)      #-563   (6)
M_PSL_ERR                  =00000200     137   (2)      #-581   (6)
M_READY                    =00000001     119   (2)      #-1086  (11)  #-1206  (12)  #-1324  (13)  #-1443  (14)
                                                        #-1568  (16)  #-1654  (17)  #-1740  (18)  #-1829  (19)
                                                        #-1917  (20)  #-691   (8)   #-838   (9)   #-965   (10)
M_SP_ERR                   =00008000     149   (2)      #-558   (6)
M_TIMER                    =00000020     129   (2)      #-511   (6)
M_XFC                      =00000800     141   (2)      #-538   (6)
M_XFC_ERR                  =00000010     127   (2)      #-529   (6)
PCS                        =00000008     95    (2)
POWER_FAIL                 =00000003     95    (2)
PR$_ICCS                    00000000-XR                 #-510   (6)
PR$_ISP                     00000000-XR                 #-1095  (11)  #-1215  (12)  #-1333  (13)  #-1452  (14)
                                                        #-1495  (15)  #-1577  (16)  #-1663  (17)  #-1749  (18)
                                                        #-1839  (19)  #-500   (6)   #-617   (7)   #-854   (9)
                                                        #-979   (10)
PR$_KSP                     00000000-XR                 #-499   (6)
PR$_SCBB                    00000000-XR                 #-1826  (19)  #-1908  (20)
PRT$C_KR                    00000000-XR                 #-827   (9)
PRT$C_KW                    00000000-XR                 #-800   (9)   #-861   (9)
PSL$K_EXEC                 =00000001     92    (2)
PSL$K_KERNEL               =00000000     92    (2)
PSL$K_SUPER                =00000002     92    (2)
PSL$K_USER                 =00000003     92    (2)
PSL$M_CBIT                 =00000001     92    (2)
PSL$M_NBIT                 =00000008     92    (2)
PSL$M_VBIT                 =00000002     92    (2)
PSL$M_ZBIT                 =00000004     92    (2)
PSL$S_CURMOD               =00000002                   #-570   (6)   #-572   (6)
PSL$V_CBIT                 =00000000     92    (2)
PSL$V_CURMOD               =00000018                   #-570   (6)   #-572   (6)
PSL$V_IS                   =0000001A                   #-1069  (11)  #-1090  (11)  #-1189  (12)  #-1210  (12)
                                                        #-1307  (13)  #-1328  (13)  #-1426  (14)  #-1447  (14)
                                                        #-1572  (16)  #-1658  (17)  #-1744  (18)  #-1834  (19)
                                                        #-559   (6)   #-575   (6)   #-577   (6)   #-809   (9)
                                                        #-849   (9)   #-944   (10)  #-974   (10)
PSL$V_NBIT                 =00000003     92    (2)
PSL$V_VBIT                 =00000001     92    (2)
PSL$V_ZBIT                 =00000002     92    (2)
READ_GPR                    00000C6A-R   487   (6)      179   (2)
REG_TABLE                   00000000-XR                 417   (5)
RENTRY1                     00000159-R   695   (8)      676   (8)
RENTRY10                    000008EC-R   1305  (13)     1299  (13)
RENTRY11                    000009AD-R   1327  (13)     1312  (13)
RENTRY12                    00000A6C-R   1424  (14)     1418  (14)
RENTRY13                    00000B2D-R   1446  (14)     1431  (14)
RENTRY15                    0000013C-R   1571  (16)     1559  (16)
RENTRY16                    0000026E-R   1657  (17)     1645  (17)
RENTRY17                    000003A0-R   1743  (18)     1731  (18)
RENTRY18                    000004EF-R   1832  (19)     1817  (19)
```

```
RENTRY19                        0000062A-R  1920  (20)     1907  (20)
RENTRY2                         00000220-R  807   (9)      804   (9)
RENTRY3                         00000363-R  847   (9)      816   (9)
RENTRY4                         00000450-R  942   (10)     939   (10)
RENTRY5                         00000530-R  972   (10)     952   (10)
RENTRY6                         000005EC-R  1067  (11)     1061  (11)
RENTRY7                         000006AD-R  1089  (11)     1074  (11)
RENTRY8                         0000076C-R  1187  (12)     1181  (12)
RENTRY9                         0000082D-R  1209  (12)     1194  (12)
RENTRY_POINT                    00000004-R  99    (2)   #-1074  (11)  #-1194  (12)  #-1312  (13)  #-1431  (14)
                                                        #-1559  (16)  #-1645  (17)  #-1731  (18)  #-1817  (19)
                                                        #-1907  (20)    502   (6)  #-676   (8)  #-816   (9)
                                                        #-952   (10)
RESTART                         =00000100   177   (2)   #-1072  (11)  #-1073  (11)  #-1192  (12)  #-1193  (12)
                                                        #-1310  (13)  #-1311  (13)  #-1429  (14)  #-1430  (14)
                                                        #-1557  (16)  #-1558  (16)  #-1643  (17)  #-1644  (17)
                                                        #-1729  (18)  #-1730  (18)  #-1815  (19)  #-1816  (19)
                                                        #-1905  (20)  #-1906  (20)    448   (6)    449   (6)
                                                        #-674   (8)   #-675   (8)  #-814   (9)  #-815   (9)
                                                        #-950   (10)  #-951   (10)
SCB$L_CHME                       00000044               #-1300  (13)  #-1340  (13)  #-1727  (18)  #-1755  (18)
SCB$L_CHMK                       00000040               #-1419  (14)  #-1459  (14)  #-1813  (19)  #-1827  (19)
                                                        #-1845  (19)
SCB$L_CHMS                       00000048               #-1182  (12)  #-1222  (12)  #-1641  (17)  #-1669  (17)
SCB$L_CHMU                       0000004C               #-1062  (11)  #-1102  (11)  #-1555  (16)  #-1583  (16)
SCB$L_OPCCUS                     00000014               #-1061  (11)  #-1101  (11)  #-1181  (12)  #-1221  (12)
                                                        #-1299  (13)  #-1339  (13)  #-1418  (14)  #-1458  (14)
                                                        #-1904  (20)  #-1927  (20)  #-804   (9)  #-812   (9)
                                                        #-813   (9)   #-866   (9)  #-939   (10)  #-947   (10)
                                                        #-949   (10)  #-987   (10)
SCB$L_TIMER                      000000C0               #-1461  (14)  #-1497  (15)  #-1929  (20)  #-619   (7)
SEP_FUNCTIONAL                  =00000002   73    (2)
SEP_REPAIR                      =00000003   73    (2)
SETUP_RPB                        00000C00-R 445   (6)     1076  (11)    1196  (12)    1314  (13)    1433  (14)
                                                          678  (8)     819  (9)     955  (10)
SIZ...                          =00000001   92    (2)     73  (2)     92  (2)
SYS$SETPRT                       00010430               800  (9)     827  (9)     861  (9)
T4_S1                            00000088-R 670   (8)
T4_S1_X                          000001A0-R 704   (8)
T4_S2                            000001AB-R 794   (9)
T4_S2_X                          0000040E-R 867   (9)
T4_S3                            00000419-R 934   (10)
T4_S3_X                          0000059A-R 988   (10)
T4_S4                            000005A5-R 1057  (11)
T4_S4_X                          0000071D-R 1103  (11)
T4_S5                            00000728-R 1177  (12)
T4_S5_X                          0000089D-R 1223  (12)
T4_S6                            000008A8-R 1295  (13)
T4_S6_X                          00000A1D-R 1341  (13)
T4_S7                            00000A28-R 1414  (14)
T4_S7_X                          00000B9D-R 1460  (14)
T5_S1                            00000080-R 1552  (16)
T5_S1_X                          000001A7-R 1584  (16)
T5_S2                            000001B2-R 1638  (17)
T5_S2_X                          000002D9-R 1670  (17)
```

```
T5_S3                           000002E4-R   1724   (18)
T5_S3_X                         0000040B-R   1756   (18)
T5_S4                           00000416-R   1810   (19)
T5_S4_X                         00000561-R   1846   (19)
T5_S5                           0000056C-R   1901   (20)
T5_S5_X                         00000674-R   1928   (20)
TEST_004                        00000030-R   611    (7)      611    (7)
TEST_004_X                      00000BB8-R   1462   (14)
TEST_005                        00000028-R   1486   (15)     1486   (15)
TEST_005_X                      0000068F-R   1931   (20)
TIMER_SERVICE                   00000CB8-R   509    (6)      1497   (15)     619    (7)
TU58                           =00000002     95     (2)
T_ACT_PSL                       000008E7-R   330    (4)      405    (5)
T_BAD_DATA                      000007D4-R   309    (4)
T_CHMESCB_ERR                   0000052B-R   264    (4)    #-1752   (18)
T_CHME_ERR                      000003DD-R   245    (4)    #-1336   (13)
T_CHMKSCB_ERR                   00000566-R   267    (4)    #-1842   (19)
T_CHMK_ERR                      00000405-R   248    (4)    #-1455   (14)
T_CHMSSCB_ERR                   000004F0-R   261    (4)    #-1666   (17)
T_CHMS_ERR                      000003B5-R   242    (4)    #-1218   (12)
T_CHMUSCB_ERR                   000004B5-R   258    (4)    #-1580   (16)
T_CHMU_ERR                      0000038D-R   239    (4)    #-1098   (11)
T_CHMX_ERR                      0000065B-R   282    (4)      379    (5)
T_CONTINUE                      00000212-R   216    (3)      1079   (11)     1199   (12)     1317   (13)     1436   (14)
                                                             1561   (16)     1647   (17)     1733   (18)     1819   (19)
                                                             1911   (20)     681    (8)      822    (9)      958    (10)
T_DBL_MCHK_ERR                  000000E6-R   195    (3)
T_EXECUTE                       00000601-R   276    (4)      377    (5)
T_EXITING                       000001C7-R   207    (3)
T_EXP_PSL                       000008C2-R   327    (4)      401    (5)
T_GOOD_DATA                     000007FB-R   312    (4)
T_GPR                           00000929-R   336    (4)      412    (5)
T_GPR_ERR                       000007AB-R   306    (4)
T_HALT_ERR                      000002F1-R   230    (4)    #-699    (8)
T_HALT_MESS                     000002C1-R   227    (4)      370    (5)
T_INSTRUCTIONS                  000001DC-R   211    (3)      1078   (11)     1198   (12)     1316   (13)     1435   (14)
                                                             1560   (16)     1646   (17)     1732   (18)     1818   (19)
                                                             1910   (20)     680    (8)      821    (9)      957    (10)
T_INVLDIS_ERR                   00000315-R   233    (4)    #-857    (9)
T_ISP_ERR1                      00000715-R   294    (4)      389    (5)
T_ISP_ERR2                      00000743-R   297    (4)      391    (5)
T_KSP_ERR1                      000006B9-R   288    (4)      384    (5)
T_KSP_ERR2                      000006E7-R   291    (4)      386    (5)
T_NOT_DONE                      000005D3-R   273    (4)      375    (5)
T_NOT_ON_IS                     0000089B-R   324    (4)      1070   (11)     1190   (12)     1308   (13)     1427   (14)
                                                             810    (9)      945    (10)
T_NOT_ON_KS                     00000877-R   321    (4)
T_NOT_READY                     000005A1-R   270    (4)      373    (5)
T_NOXOR                         0000096B-R   342    (4)      422    (5)
T_NO_OPER                       0000004D-R   190    (3)      1488   (15)     613    (7)
T_NXMIS_ERR                     00000350-R   236    (4)    #-983    (10)
T_NXM_WCS_ERR                   00000124-R   198    (3)
T_PAGE0PROT                     00000816-R   315    (4)      802    (9)
T_PAGEPROT                      00000844-R   318    (4)      829    (9)      863    (9)
T_PSL                           0000090C-R   333    (4)      410    (5)
```

```
T_REST_OFF                      00000197-R    204     (3)
T_SCBBNXM_ERR                   0000015B-R    201     (3)
T_SCB_ERR                       0000042D-R    251     (4)     #-1924    (20)
T_SP_ERR1                       00000771-R    300     (4)       393     (5)
T_SP_ERR2                       0000079F-R    303     (4)       395     (5)
T_TIMER                         00000691-R    285     (4)       425     (5)
T_WARNING                       00000262-R    220     (3)      1491     (15)      615     (7)
T_WCS_ERR                       00000463-R    254     (4)
T_XFC                           00000626-R    279     (4)       381     (5)
T_XOR                           00000951-R    339     (4)       420     (5)
V_BAD_MODE                    =00000006       130     (2)
V_BAD_STK                     =00000007       132     (2)
V_CHMX_ERR                    =00000003       124     (2)     #-378     (5)     #-588     (6)
V_DONE                        =00000001       120     (2)     #-374     (5)     #-586     (6)
V_ERROR_FLAG                  =0000000C       142     (2)     #-1097    (11)    #-1217    (12)    #-1335    (13)    #-1454    (14)
                                                              #-1579    (16)    #-1665    (17)    #-1751    (18)    #-1841    (19)
                                                              #-1923    (20)    #-698     (8)     #-856     (9)     #-982     (10)
V_EXECUTE_ERR                 =00000002       122     (2)     #-376     (5)     #-584     (6)
V_FATAL_ERR                   =00000008       134     (2)     #-1099    (11)    #-1219    (12)    #-1337    (13)    #-1456    (14)
                                                              #-1581    (16)    #-1667    (17)    #-1753    (18)    #-1843    (19)
                                                              #-1925    (20)    #-702     (8)     #-859     (9)     #-984     (10)
V_GPR_ERR                     =0000000A       138     (2)     #-411     (5)
V_ISP_ERR                     =0000000E       146     (2)     #-388     (5)
V_ISTK                        =00000010       150     (2)     #-382     (5)     #-387     (5)     #-564     (6)
V_KSP_ERR                     =0000000D       144     (2)     #-383     (5)
V_PSL_ERR                     =00000009       136     (2)     #-396     (5)
V_READY                       =00000000       118     (2)     #-372     (5)     #-582     (6)
V_SP_ERR                      =0000000F       148     (2)     #-392     (5)
V_TIMER                       =00000005       128     (2)     #-424     (5)     #-592     (6)
V_USR_WCS                     =00000019       154     (2)
V_XFC                         =0000000B       140     (2)
V_XFC_ERR                     =00000004       126     (2)     #-380     (5)     #-590     (6)
WCS                           =00000007       95      (2)
XFC_ERROR                       00000CCC-R    528     (6)       1904    (20)
XFC_SERVICE                     00000CD8-R    537     (6)       813     (9)       949     (10)
```

Macros Cross Reference

MACRO	SIZE	DEFINITION	REFERENCES...
$D1_ABPROGRAM	1	614 (7)	1071 (11) 1100 (11) 1191 (12) 1220 (12) 1309 (13) 1338 (13) 1428 (14) 1457 (14) 1489 (15) 1582 (16) 1668 (17) 1754 (18) 1844 (19) 1926 (20) 614 (7) 701 (8) 703 (8) 803 (9) 811 (9) 830 (9) 858 (9) 860 (9) 864 (9) 946 (10) 985 (10)
$D1_BSUBT	1	670 (8)	1057 (11) 1177 (12) 1295 (13) 1414 (14) 1552 (16) 1638 (17) 1724 (18) 1810 (19) 1901 (20) 670 (8) 794 (9) 934 (10)
$D1_BTEST	1	611 (7)	1486 (15) 611 (7)
$D1_ERR	1	699 (8)	1070 (11) 1098 (11) 1190 (12) 1218 (12) 1308 (13) 1336 (13) 1427 (14) 1455 (14) 1580 (16) 1666 (17) 1752 (18) 1842 (19) 1924 (20) 699 (8) 802 (9) 810 (9) 829 (9) 857 (9) 863 (9) 945 (10) 983 (10)
$D1_ERR_S	1	699 (8)	1070 (11) 1098 (11) 1190 (12) 1218 (12) 1308 (13) 1336 (13) 1427 (14) 1455 (14) 1580 (16) 1666 (17) 1752 (18) 1842 (19) 1924 (20) 699 (8) 802 (9) 810 (9) 829 (9) 857 (9) 863 (9) 945 (10) 983 (10)
$D1_ESUBT	1	704 (8)	1103 (11) 1223 (12) 1341 (13) 1460 (14) 1584 (16) 1670 (17) 1756 (18) 1846 (19) 1928 (20) 704 (8) 867 (9) 988 (10)
$D1_ETEST	1	1462 (14)	1462 (14) 1931 (20)
$D1_PRINT_S	1	370 (5)	1078 (11) 1079 (11) 1198 (12) 1199 (12) 1316 (13) 1317 (13) 1435 (14) 1436 (14) 1488 (15) 1491 (15) 1560 (16) 1561 (16) 1646 (17) 1647 (17) 1732 (18) 1733 (18) 1818 (19) 1819 (19) 1910 (20) 1911 (20) 370 (5) 371 (5) 373 (5) 375 (5) 377 (5) 379 (5) 381 (5) 384 (5) 386 (5) 389 (5) 391 (5) 393 (5) 395 (5) 401 (5) 405 (5) 410 (5) 412 (5) 420 (5) 422 (5) 425 (5) 613 (7) 615 (7) 680 (8) 681 (8) 821 (9) 822 (9) 957 (10) 958 (10)
$D1_SBTTL	2	598 (7)	1107 (12) 1226 (13) 1344 (14) 1467 (15) 1501 (16) 1587 (17) 1673 (18) 1759 (19) 1850 (20) 598 (7) 623 (8) 707 (9) 870 (10) 991 (11)
$D2_BDATA	1	611 (7)	1486 (15) 611 (7)
$D2_BTEST	1	611 (7)	1486 (15) 611 (7)
$D2_SBTTL	1	598 (7)	1467 (15) 598 (7)
$DEF	1	92 (2)	
$DEFINI	1	88 (2)	88 (2) 91 (2) 92 (2) 93 (2)
$DS_ABORT	1	614 (7)	1071 (11) 1100 (11) 1191 (12) 1220 (12) 1309 (13) 1338 (13) 1428 (14) 1457 (14) 1489 (15) 1582 (16) 1668 (17) 1754 (18) 1844 (19) 1926 (20) 614 (7) 701 (8) 703 (8) 803 (9) 811 (9) 830 (9) 858 (9) 860 (9) 864 (9) 946 (10) 985 (10)
$DS_BCOMPLETE	1	700 (8)	700 (8) 801 (9) 828 (9) 862 (9)
$DS_BGNMESSAGE	1	367 (5)	367 (5)

```
$DS_BGNMOD          1       73      (2)     73      (2)
$DS_BGNSUB          1       670     (8)     1057    (11)    1177    (12)    1295    (13)    1414    (14)    1552    (16)
                                            1638    (17)    1724    (18)    1810    (19)    1901    (20)    670     (8)
                                            794     (9)     934     (10)
$DS_BGNTEST         1       611     (7)     1486    (15)    611     (7)
$DS_BOPER           1       612     (7)     1487    (15)    612     (7)
$DS_BREAK           1       1462    (14)    1462    (14)    1931    (20)
$DS_CLRVEC_S        1       812     (9)     1101    (11)    1102    (11)    1221    (12)    1222    (12)    1339    (13)
                                            1340    (13)    1458    (14)    1459    (14)    1461    (14)    1583    (16)
                                            1669    (17)    1755    (18)    1845    (19)    1927    (20)    1929    (20)
                                            812     (9)     866     (9)     947     (10)    987     (10)
$DS_CVTREG_S        1       398     (5)     398     (5)     402     (5)     407     (5)
$DS_DSADEF          5       93      (2)     93      (2)
$DS_DSDEF           2       89      (2)     89      (2)
$DS_DSSDEF          8       91      (2)     91      (2)
$DS_ENDDATA         1       611     (7)     1486    (15)    611     (7)
$DS_ENDMESSAGE      1       427     (5)     427     (5)
$DS_ENDMOD          1       1933    (20)    1933    (20)
$DS_ENDSUB          1       704     (8)     1103    (11)    1223    (12)    1341    (13)    1460    (14)    1584    (16)
                                            1670    (17)    1756    (18)    1846    (19)    1928    (20)    704     (8)
                                            867     (9)     988     (10)
$DS_ENDTEST         1       1462    (14)    1462    (14)    1931    (20)
$DS_ENVDEF          2       73      (2)     73      (2)
$DS_ERRDEF          1       90      (2)     90      (2)
$DS_ERRHARD_S       1       699     (8)     1070    (11)    1098    (11)    1190    (12)    1218    (12)    1308    (13)
                                            1336    (13)    1427    (14)    1455    (14)    1580    (16)    1666    (17)
                                            1752    (18)    1842    (19)    1924    (20)    699     (8)     810     (9)
                                            857     (9)     945     (10)    983     (10)
$DS_ERRSYS_S        1       802     (9)     802     (9)     829     (9)     863     (9)
$DS_MMOFF_S         1       865     (9)     865     (9)     986     (10)
$DS_MMON_S          1       799     (9)     799     (9)     938     (10)
$DS_PAGE            1       596     (6)     1104    (11)    1224    (12)    1342    (13)    1463    (14)    1499    (15)
                                            1585    (16)    1671    (17)    1757    (18)    1847    (19)    1930    (20)
                                            596     (6)     621     (7)     705     (8)     868     (9)     989     (10)
$DS_PRINTB_S        1       370     (5)     370     (5)     371     (5)     373     (5)     375     (5)     377     (5)
                                            379     (5)     381     (5)     384     (5)     389     (5)     393     (5)
                                            401     (5)     405     (5)     412     (5)     420     (5)     425     (5)
$DS_PRINTF_S        1       613     (7)     1078    (11)    1079    (11)    1198    (12)    1199    (12)    1316    (13)
                                            1317    (13)    1435    (14)    1436    (14)    1488    (15)    1491    (15)
                                            1560    (16)    1561    (16)    1646    (17)    1647    (17)    1732    (18)
                                            1733    (18)    1818    (19)    1819    (19)    1910    (20)    1911    (20)
                                            613     (7)     615     (7)     680     (8)     681     (8)     821     (9)
                                            822     (9)     957     (10)    958     (10)
$DS_PRINTX_S        1       386     (5)     386     (5)     391     (5)     395     (5)     410     (5)     422     (5)
$DS_PSLDEF          1       92      (2)     92      (2)
$DS_SBTTL           1       598     (7)     1107    (12)    1226    (13)    1344    (14)    1467    (15)    1501    (16)
                                            1587    (17)    1673    (18)    1759    (19)    1850    (20)    598     (7)
                                            623     (8)     707     (9)     870     (10)    991     (11)
$DS_SCBDEF          3       88      (2)     88      (2)
$DS_SECDEF          1       95      (2)     95      (2)
$DS_SETVEC_S        1       619     (7)     1061    (11)    1062    (11)    1181    (12)    1182    (12)    1299    (13)
                                            1300    (13)    1418    (14)    1419    (14)    1497    (15)    1555    (16)
                                            1641    (17)    1727    (18)    1813    (19)    1904    (20)    619     (7)
                                            804     (9)     813     (9)     939     (10)    949     (10)
$EQU                1       92      (2)     73      (2)     89      (2)     92      (2)
```

```
$EQULS1          1       92    (2)       73    (2)       89    (2)       92    (2)
$EQULST          1       73    (2)       73    (2)       89    (2)       92    (2)
$GBLINI          2       73    (2)       73    (2)       89    (2)       92    (2)
$OFFDEF          1       90    (2)       90    (2)
$PSLDEF          2       92    (2)       92    (2)
$PUSHADR         1      400    (5)     1070   (11)     1098   (11)     1190   (12)     1218   (12)     1308   (13)
                                        1336   (13)     1427   (14)     1455   (14)     1580   (16)     1666   (17)
                                        1752   (18)     1842   (19)     1924   (20)      400    (5)      404    (5)
                                         409    (5)      699    (8)      800    (9)      802    (9)      810    (9)
                                         827    (9)      829    (9)      857    (9)      861    (9)      863    (9)
                                         945   (10)      983   (10)
$PUSHTWO         1      800    (9)      800    (9)      827    (9)      861    (9)
$SETPRT_S        1      800    (9)      800    (9)      827    (9)      861    (9)
$VIELD           1       73    (2)       73    (2)       92    (2)
$VIELD1          1       92    (2)       73    (2)       92    (2)
ECKAX_SECDEF     1       95    (2)       95    (2)
```

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	117	00:00:00.26	00:00:01.25
Command processing	880	00:00:00.81	00:00:02.45
Pass 1	1134	00:00:28.10	00:00:53.40
Symbol table sort	0	00:00:00.86	00:00:00.93
Pass 2	42	00:00:08.30	00:00:14.65
Symbol table output	2	00:00:00.40	00:00:00.63
Psect synopsis output	2	00:00:00.04	00:00:00.04
Cross-reference output	7	00:00:03.16	00:00:05.48
Assembler run totals	2185	00:00:41.95	00:01:18.84

```
The working set limit was 3062 pages.
323343 bytes (632 pages) of virtual memory were used to buffer the intermediate code.
There were 40 pages of symbol table space allocated to hold 574 non-local and 151 local symbols.
1934 source lines were read in Pass 1, producing 48 object records in Pass 2.
111 pages of virtual memory were used to define 55 macros.
```

Macro library statistics

Macro library name	Macros defined
DISK$DIAGPACK02:[TAYLOR.ECKAX]ECKAX.MLB;1	1
SYS$COMMON:[SYSLIB]DIAG.MLB;955	45
SYS$COMMON:[SYSLIB]STARLET.MLB;1	10
TOTALS (all libraries)	56

```
828 GETS were required to define 56 macros.

There were no errors, warnings or information messages.

MACRO/LIS=ECKAX4.LIS/CROSS ECKAX4
```

Table of contents

(1)	1	ECKAX5: WRITABLE CONTROL STORE
(2)	63	DECLARATIONS
(3)	220	SUBROUTINES
(5)	448	ERROR MESSAGES
(7)	517	ERROR REPORTING ROUTINES
(8)	585	TEST 6: WCS Memory Test
(9)	620	SUBTEST 6.1: Data Path
(10)	698	SUBTEST 6.2: Row Select
(11)	766	SUBTEST 6.3: Address Path
(12)	831	SUBTEST 6.4: Moving Inversions
(13)	962	TEST 7: WCS Execution Test
(14)	990	SUBTEST 7.1: WCS Entry/Exit
(15)	1042	SUBTEST 7.2: WCS "Next Field" Addressing

```
0000     1          .SBTTL  ECKAX5: WRITABLE CONTROL STORE
0000     2          .TITLE  ECKAX5  VAX-11/750 Specific CPU Cluster Exerciser
0000     3          .IDENT  /5.2/
0000     4
0000     5 ;
0000     6 ; Copyright (C) 1980,1983,1986
0000     7 ; Digital Equipment Corporation, Maynard, Massachusetts 01754
0000     8 ;
0000     9 ; This software is furnished  under a license for use only on a single
0000    10 ; computer  system and  may be  copied only with  the inclusion of the
0000    11 ; above copyright notice.  This software, or any other copies thereof,
0000    12 ; may not be provided or  otherwise made available to any other person
0000    13 ; except for use on such system and to one who agrees to these license
0000    14 ; terms.  Title to and  ownership of the  software  shall at all times
0000    15 ; remain in DEC.
0000    16 ;
0000    17 ; The information in this software is subject to change without notice
0000    18 ; and should  not be construed  as a commitment  by Digital  Equipment
0000    19 ; Corporation.
0000    20 ;
0000    21 ; DEC assumes  no  responsibility  for  the use or  reliability of its
0000    22 ; software on equipment which is not supplied by DEC.
0000    23 ;
0000    24
0000    25 ;++
0000    26 ; Facility:     VAX Architecture Diagnostic.
0000    27 ;
0000    28 ; Abstract:     This module tests the writable contole store for parity
0000    29 ;               errors, addressing errors and sequence timing errors.
0000    30 ;
0000    31 ;
0000    32 ; Environment:  VAX Diagnostic Supervisor.
0000    33 ;
0000    34 ; Author:       Fred Roemer     10-Nov-80       Version 2.1
0000    35 ;
0000    36 ;       NO CHANGES TO THIS MODULE FOR VERSION 3.3 (DOCUMENT CHANGE ONLY)
0000    37 ;
0000    38 ;
0000    39 ;       Dan Milleville  19-Mar-82               Version 3.4
0000    40 ;       Changed Test 3 exit code to accmodate temporarily a hardware problem.
0000    41 ;
0000    42 ;       Dave Shull      30-Nov-82               Version 4.0
0000    43 ;       Added tests 13 and 14 for coverage of PCS module.
0000    44 ;
0000    45 ;       Tai-Chun Pan    04-Mar-83               Version 5.0
0000    46 ;       Added test 5 for coverage of Processor Halts Architecture Undefined.
0000    47 ;       Added tests 11 and 12 for coverage of new ROM with MRSP of TU58.
0000    48 ;
0000    49 ;       Dan Milleville  21-Nov-83               Version 5.1
0000    50 ;       Fixed error in timer routine (didn't turn off timer).
0000    51 ;
0000    52 ;       Wayne R. Taylor February 1986           Version 5.2
0000    53 ;       Redefined IPR's ti jive with starlet.
0000    54 ;       Modified the code for problem report Eckax5 where:
0000    55 ;               Tests 6 & 13 tests with cache off. They want it on.
```

```
0000     56 ;                  Subtest 1 does not check bit 0 of the memory under test.
0000     57 ;                  Subtest 4 tests row 0, 1, 2, but not row 3.
0000     58 ;          Modifications were supplied by the submitter.
0000     59 ;          Search on 5.2
0000     60 ;
0000     61 ;--
```

```
                        0000     63          .SBTTL  DECLARATIONS
                        0000     64          .LIST   MEB
                        0000     65          .NLIST  CND
                    00000000     66          .PSECT  ECKAXE, PAGE, NOWRT
                        0000     67          .LIBRARY        "SYS$LIBRARY:DIAG"; VAX family diagnostic library.
                        0000     68          $DS_BGNMOD      CEP_REPAIR, TN=6
                        0000        ;;;      Macro-32 Diagnostic macro library Version 8.3 "DIAG.MLB (245)"
                        0000     69
                        0000     70 ;
                        0000     71 ; Include files:
                        0000     72 ;
                        0000     73
                        0000     74          .LIBRARY        "ECKAX"         ; CPU Cluster Exerciser library.
                        0000     75
                        0000     79
                        0000     80          $DS_SCBDEF
                        0000     81          $DS_DSADEF
                        0000     82          $DS_DSDEF
                        0000     83          $DS_PARDEF
                        0000     84          $DS_PSLDEF
                        0000     85          $DS_ERRDEF
                        0000     86          $DS_DSSDEF
                        0000     87          $DS_HPODEF
                        0000     88          $DS_KA_DEF
                        0000     89          ECKAX_SECDEF
                        0000     90          $PR750DEF       ; 5.2
                        0000     91
                        0000     92 ;
                        0000     93 ; Own storage:
                        0000     94 ;
                        0000     95
                    00000004    0000     96 L_COUNT:         .BLKL                   ; used as a counter
                    00000008    0004     97 L_INC:           .BLKL                   ; used to store increment
                    0000000C    0008     98 L_ROW:           .BLKL                   ; used to store current row
                    00000010    000C     99 A_RETURN:        .BLKL                   ; used to store return address
                                0010    100
                    00000014    0010    101 L_FLAGS:         .BLKL                   ; contains the following flags
                                0014    102
                    00000000    0014    103 V_PAT=0                                 ; pattern done flag
                    00000001    0014    104 M_PAT=1a0                               ;
                    00000001    0014    105 V_DATA_ERR=1                            ; data error flag
                    00000002    0014    106 M_DATA_ERR=1a1                          ;
                    00000002    0014    107 V_ROW_ERR=2                             ; row error flag
                    00000004    0014    108 M_ROW_ERR=1a2                           ;
                    00000003    0014    109 V_REVERSE=3                             ; reverse direction flag
                    00000008    0014    110 M_REVERSE=1a3                           ;
                    00000004    0014    111 V_XFC_ERR=4                             ; unexpected XFC exception flag
                    00000010    0014    112 M_XFC_ERR=1a4                           ;
                                0014    113
                    00000000    0014    114 L_PERM_FLAGS:    .LONG   0              ; contains the following flags
                                0018    115
                    00000000    0018    116 V_OLD_WCS=0                             ; old WCS module (ie., no PCS)
                    00000001    0018    117 M_OLD_WCS=1a0
                                0018    118
                    0000000E    0018    119 V_BIT14=14                              ; bit position for bit 14
```

```
                    0000000F  0018   120 V_BIT15=15
                    00080000  0018   121 M_BIT19=1a19                          ; bit mask for bit 19
                    00100000  0018   122 M_BIT20=1a20                          ; bit mask for bit 20
                              0018   123
                    00F00000  0018   124 A_WCS_ADDRESS:  .LONG   ^XF00000       ; used to store address of WCS memory
                              001C   125
                    00F0C000  001C   126 A_WCS_ENA_ADDR: .LONG   ^XF0C000       ; address of wcs write enable register
                              0020   127
                              0020   128 V_OVERFLOW_BIT:
                    0000000E  0020   129                  .LONG   14            ; used to store bit number for overflow
                              0024   130                                        ; check
                              0024   131
                    0000000A  0024   132 ADDR_SIZE:      .LONG   10            ; size of address vield for 1k WCS
                              0028   133
                              0028   134 WCS_MAX_SIZE_MWORDS:
                    000003FF  0028   135                  .LONG   1023          ; used to store WCS size
                              002C   136
                              002C   137 WCS_MAX_SIZE_LWORDS:
                    00000FFF  002C   138                  .LONG   4095          ; size of WCS in Longwords
                              0030   139
                              0030   140 MICRO_WORD_COUNT:
                    000003E5  0030   141                  .LONG   997           ; used to store number of microwords to
                              0034   142                                        ; be loaded depending of size of WCS
                              0034   143                                        ; (1k or 2k)
                              0034   144 TEST_VALUE:
                    000003F5  0034   145                  .LONG   1013          ; used to store value that will be
                              0038   146                                        ; use to decrement while running from
                              0038   147                                        ; WCS
                              0038   148
                              0038   149
                              0038   150 A_ENA_REGISTER:
                    00F0C000  0038   151                  .LONG   ^XF0C000      ; Register address to enable writing of
                              003C   152                                        ; WCS
                              003C   153
                              003C   154 DATA_PATTERN:
                    00200000  003C   155                  .LONG   ^X200000      ; floating one pattern
                    FFDFFFFF  0040   156                  .LONG   ^XFFDFFFFF    ; floating zero pattern
                              0044   157
                    000000C4  0044   158 A_WCS_BUF:      .BLKL   32            ; area used to store data
                              00C4   159
                    00000144  00C4   160 DECODED_WORDS:  .BLKL   32            ; area used to store decoded data words
                              0144   161
                    000001C4  0144   162 NOISY_WORDS:    .BLKL   32            ; area used to store encoded data words
                              01C4   163
                    0000FFFF  01C4   164 CODEVECTORS:    .LONG   ^XFFFF        ; identity vector
                    00005555  01C8   165                  .LONG   ^X5555        ; vector 1
                    00003333  01CC   166                  .LONG   ^X3333        ; vector 2
                    00000F0F  01D0   167                  .LONG   ^X0F0F        ; vector 3
                              01D4   168
                    00000000  01D4   169 CODE_WORDS:     .LONG   ^X0000        ; encoded 0
                    0000FFFF  01D8   170                  .LONG   ^XFFFF        ; encoded 1
                    00005555  01DC   171                  .LONG   ^X5555        ; encoded 2
                    0000AAAA  01E0   172                  .LONG   ^XAAAA        ; encoded 3
                    00003333  01E4   173                  .LONG   ^X3333        ; encoded 4
                    0000CCCC  01E8   174                  .LONG   ^XCCCC        ; encoded 5
```

```
00006666  01EC   175                    .LONG   ^X6666          ; encoded 6
00009999  01F0   176                    .LONG   ^X9999          ; encoded 7
00000F0F  01F4   177                    .LONG   ^X0F0F          ; encoded 8
0000F0F0  01F8   178                    .LONG   ^XF0F0          ; encoded 9
00005A5A  01FC   179                    .LONG   ^X5A5A          ; encoded 10(decimal)
          0200   180
00000000  0200   181 DATA_TABLE:        .LONG   ^X00000
00011111  0204   182                    .LONG   ^X11111
00033333  0208   183                    .LONG   ^X33333
00077777  020C   184                    .LONG   ^X77777
000FFFFF  0210   185                    .LONG   ^XFFFFF
000EEEEE  0214   186                    .LONG   ^XEEEEE
000CCCCC  0218   187                    .LONG   ^XCCCCC
00088888  021C   188                    .LONG   ^X88888
00000000  0220   189                    .LONG   ^X00000
          0224   190
          0224   191
          0224   192 MICRO_DATA:
          0224   193                                    ; entry and exit micro words
          0224   194                                    ; next field inverted in the first 20
0000BFC2  0224   195                    .LONG   ^X0BFC2 ; bits. exit micro word at first loc.
00000487  0228   196                    .LONG   ^X00487
00092403  022C   197                    .LONG   ^X92403
000C81A5  0230   198                    .LONG   ^XC81A5
00001FC2  0234   199                    .LONG   ^X01FC2 ; entry micro word, at second location
00054047  0238   200                    .LONG   ^X54047
000BE603  023C   201                    .LONG   ^XBE603
000C2805  0240   202                    .LONG   ^XC2805
          0244   203
          0244   204                                    ; these used to build rest of u words
          0244   205                                    ; next field not yet inverted and last
          0244   206                                    ; section sets parity depending on next
          0244   207                                    ; field odd or even.
00054047  0244   208                    .LONG   ^X54047 ; common for second section of u word
00071203  0248   209                    .LONG   ^X71203 ; common for third section of u word
00002003  024C   210                    .LONG   ^X02003 ; next field for filling WCS
0000840E  0250   211                    .LONG   ^X0840E ; fourth section of u word
00002000  0254   212                    .LONG   ^X02000 ; next field for going to exit point
          0258   213
          0258   214
          0258   215
```

```
                        0258   220 .SBTTL  SUBROUTINES
                        0258   221
                        0258   222
                        0258   223 ; This subroutine is used to clear the data buffer areas in the beginning
                        0258   224 ; of this program.
                        0258   225
                        0258   226
                        0258   227 CLEAR_BUFFER:
          55   FDE8 CF   DE   0258   228          MOVAL   A_WCS_BUF,R5     ; get starting buffer address
               FD9F CF   D4   025D   229          CLRL    L_COUNT          ; initialize counter
                    85   D4   0261   230 1$:      CLRL    (R5)+            ; clear a buffer location
F4 FD94 CF    00000060 8F   F3   0263   231          AOBLEQ  #96,L_COUNT,1$ ; br = not finished
                         05   026D   232          RSB                      ; return
                        026E   233
                        026E   234 ; This routine is used to initailly zero WCS
                        026E   235
                        026E   236 CLEAR_WCS:
       04 FDA1 CF    00   E0   026E   237          BBS     #V_OLD_WCS,L_PERM_FLAGS,10$; br = old WCS module
               FDA4 DF   D4   0274   238          CLRL    @A_WCS_ENA_ADDR ; Enable writing of WCS
          55   FD9C CF   D0   0278   239 10$:     MOVL    A_WCS_ADDRESS,R5    ; get starting WCS address
               FD7F CF   D4   027D   240          CLRL    L_COUNT          ; initialize counter
                    65   D4   0281   241 20$:     CLRL    (R5)             ; clear a buffer location
               55   04   C0   0283   242          ADDL2   #4,R5            ; get next address
    F3 FD73 CF   FDA2 CF   F3   0286   243          AOBLEQ  WCS_MAX_SIZE_LWORDS,L_COUNT,20$
                        028E   244                                   ; br = not finished
                         05   028E   245          RSB                      ; return
                        028F   246
                        028F   247
                        028F   248 ; This routine is used to decode data read from the WCS that has been encoded
                        028F   249 ; in the REED - MULLER code for the address path subtest.
                        028F   250
                        028F   251 RM_DECODE:
         03FF 8F    BB   028F   252          PUSHR   #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8,R9>
              52    D4   0293   253          CLRL    R2               ; initialize word counter
           54   0B   D0   0295   254          MOVL    #11,R4           ; initialize number of words to decode
        FE27 CF42    D4   0298   255 10$:     CLRL    DECODED_WORDS[R2] ; initialize decoded word storage
           53   01   D0   029D   256          MOVL    #1,R3            ; initialize the pair seperation
           55   01   D0   02A0   257          MOVL    #1,R5            ; initialize the message bit counter
           56   0F   D0   02A3   258 20$:     MOVL    #15,R6           ; initialize the code word bit position
                58   D4   02A6   259          CLRL    R8               ; initialize the population counter
           55   01   D1   02A8   260          CMPL    #1,R5            ; if decoding bit one, skip next line
                04   13   02AB   261          BEQL    30$              ; br = do not update pair seperation
      53   53   01   78   02AD   262          ASHL    #1,R3,R3         ; update pair seperation
57     FE8E CF42    D0   02B1   263 30$:     MOVL    NOISY_WORDS[R2],R7 ; get the encoded word
        05 57   56   E1   02B7   264          BBC     R6,R7,40$        ; br = codeword bit not set and store zero
           50   01   D0   02BB   265          MOVL    #1,R0            ; store a one for bit set in first of pair
                02   11   02BE   266          BRB     50$              ; skip
                50   D4   02C0   267 40$:     CLRL    R0               ; store a zero for bit clear
           56   53   C2   02C2   268 50$:     SUBL2   R3,R6            ; point to the next bit of the pair
        05 57   56   E1   02C5   269          BBC     R6,R7,60$        ; br = codeword bit not set and store zero
           51   01   D0   02C9   270          MOVL    #1,R1            ; store a one for bit set in second of pair
                02   11   02CC   271          BRB     70$              ; skip
                51   D4   02CE   272 60$:     CLRL    R1               ; store a zero for bit clear
           51   50   CC   02D0   273 70$:     XORL2   R0,R1            ; compute the value of the relation
                02   13   02D3   274          BEQL    80$              ; br = value is not a one
```

```
                  58   D6  02D5          INCL    R8                  ; bump the population counter
        50   01   55   78  02D7  80$:    ASHL    R5,#1,R0            ; calculate 2**R5 for message bit
   59   00   56   01   7A  02DB          EMUL    #1,R6,#0,R9         ;
   50   50   59   50   7B  02E0          EDIV    R0,R9,R0,R0         ;
                  50   D5  02E5          TSTL    R0                  ;
                  03   13  02E7          BEQL    90$                 ; br =
             56   53   C0  02E9          ADDL2   R3,R6               ;
               C2 56   F4  02EC  90$:    SOBGEQ  R6,30$              ;
             04   58   D1  02EF          CMPL    R8,#4               ;
                  09   15  02F2          BLEQ    100$                ;
          FDCB CF42   DF  02F4          PUSHAL  DECODED_WORDS[R2] ;
          00 9E   55   E2  02F9          BBSS    R5,@(SP)+,100$      ;
          A2 55   03   F3  02FD  100$:   AOBLEQ  #3,R5,20$           ; br = not finished with message bits
          93 52   54   F2  0301          AOBLSS  R4,R2,10$           ; br = not finished with all codewords
                  52   D4  0305          CLRL    R2                  ; intialize word counter to do bit 0
             54   0B   D0  0307          MOVL    #11,R4              ; initialize number of words to decode
      50   FE35 CF42   D0  030A  110$:   MOVL    NOISY_WORDS[R2],R0 ; get encoded word
             53   01   D0  0310          MOVL    #1,R3               ; initialize bit counter
      56   FDAC CF42   D0  0313  120$:   MOVL    DECODED_WORDS[R2],R6 ; get a partially decoded word
   56   56   01   53   EF  0319          EXTZV   R3,#1,R6,R6         ; get a decoded bit
      56   FEA1 CF43   C4  031E          MULL2   CODEVECTORS[R3],R6 ; get product of vector and decoded bit
             50   56   CC  0324          XORL2   R6,R0               ; get XOR of each product
          E8 53   03   F3  0327          AOBLEQ  #3,R3,120$          ; do for all three decoded bits
                  55   D4  032B          CLRL    R5                  ; initialize the population counter
                  53   D4  032D          CLRL    R3                  ; initialize the bit counter
          02 50   53   E1  032F  130$:   BBC     R3,R0,140$          ; br = bit is a zero
                  55   D6  0333          INCL    R5                  ; else bump the population counter
          F6 53   0F   F3  0335  140$:   AOBLEQ  #15,R3,130$         ; do for all 16 bits
             08   55   D1  0339          CMPL    R5,#8               ; make the majority decision
                  09   15  033C          BLEQ    150$                ; br = majority not ones
          FD81 CF42   DF  033E          PUSHAL  DECODED_WORDS[R2] ; prepare to set LSB
          00 9E   00   E2  0343          BBSS    #0,@(SP)+,150$      ; set LSB in decoded word
          BF 52   54   F2  0347  150$:   AOBLSS  R4,R2,110$          ; br = not finished with all words
             03FF 8F   BA  034B          POPR    #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8,R9>
                  05   034F              RSB                         ; return
                       0350
                       0350
                       0350  ; This routine is used to load a 1K buffer area with test addresses for the
                       0350  ; moving inversions subtest. The different sequence of addresses accessed
                       0350  ; for the current increment are computed and written into the buffer area.
                       0350
                       0350  SETUP_ADDR:
        57   FCB0 CF   D0  0350          MOVL    L_INC,R7            ; save increment
   58   00000000'EF   D0  0355          MOVL    A_WCS_BUFFER,R8 ; save address of buffer to store addresses
        5B   FCB8 CF   D0  035C          MOVL    A_WCS_ADDRESS,R11 ; save first address of wcs
   59   5B   FCA3 CF   C1  0361  5$:     ADDL3   L_ROW,R11,R9        ; add row being tested to address to R9
             88   59   D0  0367  10$:    MOVL    R9,(R8)+            ; load address to use into buffer
             59   57   C0  036A          ADDL2   R7,R9               ; add increment to get next address
      F4 59   FCAF CF   E1  036D          BBC     V_OVERFLOW_BIT,R9,10$
                       0373                                          ; br = no address overflow yet
             59   57   C2  0373          SUBL2   R7,R9               ; get last address done
5A   59   FCA9 CF   04   EE  0376          EXTV    #4,ADDR_SIZE,R9,R10
                       037D                                          ; get address by itself
   5A   FFFFFFFF 8F   D1  037D          CMPL    #-1,R10             ; check for minus one
                  05   13  0384          BEQL    20$                 ; br = finished building addresses
```

```
                5B   10   C0  0386   330          ADDL2   #16,R11          ; increment the base address
                     D6   11  0389   331          BRB     5$               ; go finish building addresses
                          05  038B   332 20$:     RSB                      ; return
                              038C   333
                              038C   334 ; This subroutine will load WCS with executable micro code. The value in
                              038C   335 ; L_COUNT minus 3 will determine the number of micro words that will be loaded.
                              038C   336 ; For the entry/exit test a count of zero is used.
                              038C   337
                              038C   338 LOAD_MICRO:
          04 FC83 CF   00     E0  038C   339          BBS     #V_OLD_WCS,L_PERM_FLAGS,1$; br = old WCS module
                FC86 DF        D4  0392   340          CLRL    @A_WCS_ENA_ADDR ; Enable writing of WCS
                     5A        D4  0396   341 1$:      CLRL    R10              ; initialize a counter for first two words
             53 FC7C CF        D0  0398   342          MOVL    A_WCS_ADDRESS,R3 ; load WCS starting address
             54 FE83 CF        DE  039D   343          MOVAL   MICRO_DATA,R4    ; load address of micro code to be loaded
                63   84        D0  03A2   344 2$:      MOVL    (R4)+,(R3)       ; load 20 bits of micro word
                53   04        C0  03A5   345          ADDL2   #4,R3            ; get next address
                F6 5A   08        F2  03A8   346          AOBLSS  #8,R10,2$        ; br = until first and last words are done
                     56        D4  03AC   347          CLRL    R6               ; initialize next address field for other words
                57   84        7D  03AE   348          MOVQ    (R4)+,R7         ; load constant second 40 bits
                56   84        D0  03B1   349          MOVL    (R4)+,R6         ; setup next address field
                FC48 CF        D5  03B4   350          TSTL    L_COUNT          ; check for extra words
                     44        13  03B8   351          BEQL    30$              ; br = only one other word to load
                     50        7C  03BA   352 3$:      CLRQ    R0               ; init bit and count to figure high parity bit
                59   64        D0  03BC   353 4$:      MOVL    (R4),R9          ; load last 20 bits, parity bit not set
                02 56   50        E1  03BF   354          BBC     R0,R6,10$        ; br = bit is zero do not count
                     51        D6  03C3   355          INCL    R1               ; bit non zero, count
                F3 50   0C        F2  03C5   356 10$:     AOBLSS  #12,R0,4$        ; br = not finished checking next address field
                        07 51     E8  03C9   357          BLBS    R1,20$           ; br = odd number of bits, do not set parity
             59   00080000  8F     C8  03CC   358          BISL2   #M_BIT19,R9      ; set high parity bit
                     52   56        D0  03D3   359 20$:     MOVL    R6,R2            ; load next address field into R2
          5B 52   08   06        EF  03D6   360          EXTZV   #6,#8,R2,R11     ; get part of next field to invert
                5B   5B        B2  03DB   361          MCOMW   R11,R11          ; invert the data
          52 08   06   5B        F0  03DE   362          INSV    R11,#6,#8,R2     ; put complete next address field together
                63   52        D0  03E3   363          MOVL    R2,(R3)          ; write first 20 bits
                04 A3   57        D0  03E6   364          MOVL    R7,4(R3)         ; write second 20 bits
                08 A3   58        D0  03EA   365          MOVL    R8,8(R3)         ; write third 20 bits
                0C A3   59        D0  03EE   366          MOVL    R9,12(R3)        ; write last 20 bits
                   53   10        C0  03F2   367          ADDL2   #16,R3           ; update address for next word
                56   D6        F5  03F7   369          SOBGTR  L_COUNT,3$       ; br = load next micro word
                     07        19  03FC   370          BLSS    40$              ; br = finished
                56   04 A4        D0  03FE   371 30$:     MOVL    4(R4),R6         ; setup last next address field
                        FFB5   31  0402   372          BRW     3$               ; go load it
FC0A DF         00100000  8F     C8  0405   373 40$:     BISL2   #M_BIT20,@A_WCS_ADDRESS ; enable WCS
                          05  040E   374          RSB                      ; return
                              040F   375
                              040F   376 ; This routine is used to service unxepected XFC exceptions.
                              040F   377
                              040F   378 .ALIGN  LONG
                              0410   379
                              0410   380 XFC_SERVICE:
                FBFB CF   10     C8  0410   381          BISL2   #M_XFC_ERR,L_FLAGS ; set error flag
                          02  0415   382          REI                      ; return
                              0416   383
                              0416   384 ; This routine is used to service expected and unexpected machine check
```

```
                                0416  ; exceptions. Unexpected machine check exceptions are resignaled and
                                0416  ; reported by the Supervisor.
                                0416
                                0416  .ALIGN  LONG
                                0418
                                0418  CHECK_MCHK:
          04 AE    01    D1     0418          CMPL    #1,4(SP)          ; check for CS parity error
                   16    13     041C          BEQL    1$                ; br = yes parity error
                   0E    DD     041E          PUSHL   #14               ; put size on stack for printsig
          00660088'EF    DD     0420          PUSHL   DS$_MCHK          ; and type
                                0426          $DS_PRINTSIG_G ARGPTR=(SP)
     00010100 9F    6E    FA     0426                  CALLG   (SP), a#DS$PRINTSIG
                                042D          $DS_ABORT
     00010020 9F    6C    FA     042D                  CALLG   (AP), a#DS$ABORT
              5E    8E    C0     0434  1$:     ADDL2   (SP)+,SP          ; get over machine check logout
        6E    FBD1 CF    D0     0437          MOVL    A_RETURN,(SP)     ; set up return address
                         02     043C          REI                       ; return
                                043D
                                043D  ;
                                043D  ; This subroutine will check to see what size of WCS is installed on the system
                                043D  ; (ie., 1k or 2k) and then set-up the appropriate data structures.  If the
                                043D  ; WCS is equal to 1k then just return as the default value is for 1k.  The
                                043D  ; thing that is check is to see if the microcode revision level is greater
                                043D  ; than 94(decimal) and if not then this has to be a 1k module.  If it is
                                043D  ; greater then 94 then this could be a 2k WCS.
                                043D  ;
                                043D
                                043D  SIZE_WCS:
     55   00000000'8F    DB     043D          MFPR    #PR$_SID,R5               ; get system id register
    56   55   08    08    EF     0444          EXTZV   #8,#8,R5,R6               ; extract the micro code revision level
     00000000'EF    56    D1     0449          CMPL    R6,L_REV_CHECK            ; check the revision level
                   05    1A     0450          BGTRU   5$                        ; br = this is a L0008 module
         FBBD CF   01    C8     0452          BISL2   #M_OLD_WCS,L_PERM_FLAGS   ; set flag specifying old WCS (L0005)
     51   00000000'EF    D0     0457  5$:     MOVL    KA_PTABLE,R1              ; get address of the P table
 52   36 A1   0C    00    EF     045E          EXTZV   #0,#12,KA$W_WCS(R1),R2    ; Get WCS last address, only last
                                0464                                            ; three digits (ie., 2'3FF')
     52   000003FF 8F    D1     0464          CMPL    #1023,R2                  ; check to see if 1k module
                   67    13     046B          BEQLU   20$                       ; Branch to return if 1k module as the
                                046D                                            ; data structures default to 1k module
      1C FBA2 CF   00    E0     046D          BBS     #V_OLD_WCS,L_PERM_FLAGS,9$; br = old WCS module, if the program
                                0473                                            ; falls through to here then the attach
                                0473                                            ; was wrong (ie., the old wcs is 1k and
                                0473                                            ; the attach specified something other
                                0473                                            ; then 1k - 23FF).
     52   000007FF 8F    D1     0473          CMPL    #2047,R2                  ; check to see if 2k module
                   26    13     047A          BEQLU   10$                       ; go set-up data structures for 2k
                                047C                                            ; module
                                047C  7$:     $DS_PRINTF_S    FORMAT=T_BAD_ATTACH
          00000568'EF    9F     047C                  PUSHAB  T_BAD_ATTACH
     000100F0 9F    01    FB     0482                  CALLS   #$$N, a#DS$PRINTF
                                0489          $DS_EXIT        TEST
              50    01    D0     0489                  MOVL    #1,R0             ; NOT AN ERROR
                 FF38'    31     048C                  BRW     TEST_006_X        ; EXIT TEST 6
                                048F  9$:     $DS_PRINTF_S    FORMAT=T_BAD_ATTACH2
          000005DB'EF    9F     048F                  PUSHAB  T_BAD_ATTACH2
```

```
                000100F0 9F    01    FB  0495                          CALLS   #$$N, a#DS$PRINTF
                                       049C   433          $DS_EXIT    TEST
                         50    01    D0  049C                          MOVL    #1,R0               ; NOT AN ERROR
                            FF25'    31  049F                          BRW     TEST_006_X          ; EXIT TEST 6
                      FB79 CF    0F    D0  04A2   434 10$:    MOVL    #V_BIT15,V_OVERFLOW_BIT ; Set overflow check to bit 15
           FB78 CF    000007FF 8F    D0  04A7   435          MOVL    #2047,WCS_MAX_SIZE_MWORDS
                                       04B0   436                          ; Max size = 2047 in Microwords
           FB73 CF    00001FFF 8F    D0  04B0   437          MOVL    #8191,WCS_MAX_SIZE_LWORDS
                                       04B9   438                          ; Max size = 8191 in Longwords
           FB6E CF    000007E5 8F    D0  04B9   439          MOVL    #2021,MICRO_WORD_COUNT  ; micro word count = 2021
           FB69 CF    000007F5 8F    D0  04C2   440          MOVL    #2037,TEST_VALUE        ; test value = 2037
                      FB54 CF    0B    D0  04CB   441          MOVL    #11,ADDR_SIZE           ; Address size = 11
                         FB64 DF    D4  04D0   442          CLRL    @A_ENA_REGISTER         ; Enable writing of WCS
                                   05    04D4   443 20$:    RSB                             ; return
                                       04D5   444
                                       04D5   445
```

```
                                        04D5   447
                                        04D5   448 .SBTTL  ERROR MESSAGES
                                        04D5   449
                                        04D5   450 ;-------------------------------------------------------------------------------
                                        04D5   451 T_CS_PARITY1:
65 20 79 74 69 72 61 70 20 53 43 00'    04D5   452         .ASCIC  "CS parity error occured durring moving inversions."
64 65 72 75 63 63 6F 20 72 6F 72 72     04E1
76 6F 6D 20 67 6E 69 72 72 75 64 20     04ED
6F 69 73 72 65 76 6E 69 20 67 6E 69     04F9
                        2E 73 6E        0505
                              32        04D5
                                        0508   453 ;-------------------------------------------------------------------------------
                                        0508   454 T_CS_PARITY2:
65 20 79 74 69 72 61 70 20 53 43 00'    0508   455         .ASCIC  "CS parity error occured durring entry/exit."
64 65 72 75 63 63 6F 20 72 6F 72 72     0514
74 6E 65 20 67 6E 69 72 72 75 64 20     0520
         2E 74 69 78 65 2F 79 72        052C
                           2B           0508
                                        0534   456 ;-------------------------------------------------------------------------------
                                        0534   457 T_CS_PARITY3:
65 20 79 74 69 72 61 70 20 53 43 00'    0534   458         .ASCIC  "CS parity error occured durring next address field."
64 65 72 75 63 63 6F 20 72 6F 72 72     0540
78 65 6E 20 67 6E 69 72 72 75 64 20     054C
69 66 20 73 73 65 72 64 64 61 20 74     0558
                        2E 64 6C 65     0564
                              33        0534
                                        0568   459 ;-------------------------------------------------------------------------------
                                        0568   460 T_BAD_ATTACH:
65 72 64 64 61 20 53 43 57 2F 21 00'    0568   461         .ASCIC  "!/WCS address Not Equal to 23FF, for 1k WCS, or 27FF, !/"-
6C 61 75 71 45 20 74 6F 4E 20 73 73     0574
6F 66 20 2C 46 46 33 32 20 6F 74 20     0580
72 6F 20 2C 53 43 57 20 6B 31 20 72     058C
72 6F 66 2F 21 20 2C 46 46 37 32 20     0598
75 64 6F 6D 20 53 43 57 20 6B 32 20     05A4
61 74 74 41 2D 65 52 20 20 2E 65 6C     05B0
72 72 6F 63 20 68 74 69 77 20 68 63     05BC
64 64 61 20 74 73 61 6C 20 74 63 65     05C8
               2F 21 2E 73 73 65 72     05D4
                              72        0568
                                        05DB   462                 "for 2k WCS module.  Re-Attach with correct last address.!/"
                                        05DB   463 ;-------------------------------------------------------------------------------
                                        05DB   464 T_BAD_ATTACH2:
20 74 73 61 6C 20 53 43 57 2F 21 00'    05DB   465         .ASCIC  "!/WCS last address Not Equal to 23FF for 1k WCS.!/"-
20 74 6F 4E 20 73 73 65 72 64 64 61     05E7
46 33 32 20 6F 74 20 6C 61 75 71 45     05F3
53 43 57 20 6B 31 20 72 6F 66 20 46     05FF
                        2F 21 2E        060B
69 77 20 68 63 61 74 74 41 2D 65 52     060E   466                 "Re-Attach with correct last address.!/"
6C 20 74 63 65 72 72 6F 63 20 68 74     061A
2E 73 73 65 72 64 64 61 20 74 73 61     0626
                              2F 21     0632
                                 58     05DB
                                        0634   467 ;-------------------------------------------------------------------------------
                                        0634   468 T_NO_RESPONCE:
61 20 74 73 72 69 66 20 53 43 57 00'    0634   469         .ASCIC  "WCS first address did not respond when accessed."
```

```
6E 20 64 69 64 20 73 73 65 72 64 64  0640
77 20 64 6E 6F 70 73 65 72 20 74 6F  064C
64 65 73 73 65 63 63 61 20 6E 65 68  0658
                                 2E  0664
                                 30  0634
                                     0665   470 ;-----------------------------------------------------------------------
                                     0665   471 T_NO_WCS:
57 20 67 6E 69 74 69 78 45 2F 21 00' 0665   472         .ASCIC  "!/Exiting WCS test, WCS last address = 0.!/"
53 43 57 20 2C 74 73 65 74 20 53 43  0671
73 65 72 64 64 61 20 74 73 61 6C 20  067D
            2F 21 2E 30 20 3D 20 73  0689
                                 2B  0665
                                     0691   473 ;-----------------------------------------------------------------------
                                     0691   474 T_DATAPATH:
65 72 20 61 74 61 64 20 64 61 42 00' 0691   475         .ASCIC  "Bad data recieved checking data path."
6B 63 65 68 63 20 64 65 76 65 69 63  069D
74 61 70 20 61 74 61 64 20 67 6E 69  06A9
                              2E 68  06B5
                                 25  0691
                                     06B7   476 ;-----------------------------------------------------------------------
                                     06B7   477 T_DPERR:
21 20 3D 20 73 73 65 72 64 64 41 00' 06B7   478         .ASCIC  "Address = !XL  Expected = !XL  Actual = !XL  XOR = !XL!/"
64 65 74 63 65 70 78 45 20 20 4C 58  06C3
75 74 63 41 20 20 4C 58 21 20 3D 20  06CF
4F 58 20 20 4C 58 21 20 3D 20 6C 61  06DB
         2F 21 4C 58 21 20 3D 20 52  06E7
                                 38  06B7
                                     06F0   479 ;-----------------------------------------------------------------------
                                     06F0   480 T_ROW:
65 72 20 61 74 61 64 20 64 61 42 00' 06F0   481         .ASCIC  "Bad data recieved checking row select."
6B 63 65 68 63 20 64 65 76 65 69 63  06FC
65 6C 65 73 20 77 6F 72 20 67 6E 69  0708
                           2E 74 63  0714
                                 26  06F0
                                     0717   482 ;-----------------------------------------------------------------------
                                     0717   483 T_ROWERR:
20 20 20 73 73 65 72 64 64 41 20 00' 0717   484         .ASCIC  " Address     Expected     Actual     XOR!/"
20 20 64 65 74 63 65 70 78 45 20 20  0723
20 20 20 6C 61 75 74 63 41 20 20 20  072F
               2F 21 52 4F 58 20 20  073B
                                 2A  0717
                                     0742   485 ;-----------------------------------------------------------------------
                                     0742   486 F_ROWERR1:
4C 58 21 20 20 20 20 4C 58 21 20 00' 0742   487         .ASCIC  " !XL    !XL    !XL   !XL!/"
58 21 20 20 20 4C 58 21 20 20 20 20  074E
                           2F 21 4C  075A
                                 1A  0742
                                     075D   488 ;-----------------------------------------------------------------------
                                     075D   489 F_ROWERR2:
4C 58 21 20 20 20 20 4C 58 21 20 00' 075D   490         .ASCIC  " !XL    !XL    !XL!/"
         2F 21 4C 58 21 20 20 20 20  0769
                                 14  075D
                                     0772   491 ;-----------------------------------------------------------------------
                                     0772   492 T_ADR_ERR:
65 64 20 61 74 61 64 20 64 61 42 00' 0772   493         .ASCIC  "Bad data decoded while checking address path."
```

```
20 65 6C 69 68 77 20 64 65 64 6F 63   077E
64 64 61 20 67 6E 69 6B 63 65 68 63   078A
      2E 68 74 61 70 20 73 73 65 72   0796
                                 2D   0772
                                      07A0    494 ;-----------------------------------------------------------------------
                                      07A0    495 T_MI_ERR1:
6E 69 20 61 74 61 64 20 64 61 42 00'  07A0    496         .ASCIC  "Bad data in WCS befor writing for moving inversions."
77 20 72 6F 66 65 62 20 53 43 57 20   07AC
6D 20 72 6F 66 20 67 6E 69 74 69 72   07B8
73 72 65 76 6E 69 20 67 6E 69 76 6F   07C4
                  2E 73 6E 6F 69 6E   07D0
                                 34   07A0
                                      07D5    497 ;-----------------------------------------------------------------------
                                      07D5    498 T_MI_ERR2:
6E 69 20 61 74 61 64 20 64 61 42 00'  07D5    499         .ASCIC  "Bad data in WCS after writing for moving inversions."
77 20 72 65 74 66 61 20 53 43 57 20   07E1
6D 20 72 6F 66 20 67 6E 69 74 69 72   07ED
73 72 65 76 6E 69 20 67 6E 69 76 6F   07F9
                  2E 73 6E 6F 69 6E   0805
                                 34   07D5
                                      080A    500 ;-----------------------------------------------------------------------
                                      080A    501 T_ENTRY_ERR:
6E 69 20 61 74 61 64 20 64 61 42 00'  080A    502         .ASCIC  "Bad data in R5 executing entry/exit."
6E 69 74 75 63 65 78 65 20 35 52 20   0816
74 69 78 65 2F 79 72 74 6E 65 20 67   0822
                                 2E   082E
                                 24   080A
                                      082F    503 ;-----------------------------------------------------------------------
                                      082F    504 T_NXFIELD_ERR:
6E 69 20 61 74 61 64 20 64 61 42 00'  082F    505         .ASCIC  "Bad data in R5 while checking WCS NEXT field."
68 63 20 65 6C 69 68 77 20 35 52 20   083B
4E 20 53 43 57 20 67 6E 69 6B 63 65   0847
      2E 64 6C 65 69 66 20 54 58 45   0853
                                 2D   082F
                                      085D    506 ;-----------------------------------------------------------------------
                                      085D    507 F_WCS_ERR:
45 20 2D 20 61 74 61 64 20 35 52 00'  085D    508         .ASCIC  "R5 data - Expected = !XL  Actual = !XL  XOR = !XL!/"
58 21 20 3D 20 64 65 74 63 65 70 78   0869
20 3D 20 6C 61 75 74 63 41 20 20 4C   0875
21 20 3D 20 52 4F 58 20 20 4C 58 21   0881
                  2F 21 4C 58         088D
                                 33   085D
                                      0891    509 ;-----------------------------------------------------------------------
                                      0891    510 T_XFC_ERR:
69 20 79 72 74 6E 65 20 43 46 58 00'  0891    511         .ASCIC  "XFC entry in SCB went into memory instead of WCS.!/"
69 20 74 6E 65 77 20 42 43 53 20 6E   089D
69 20 79 72 6F 6D 65 6D 20 6F 74 6E   08A9
43 57 20 66 6F 20 64 61 65 74 73 6E   08B5
                  2F 21 2E 53         08C1
                                 33   0891
                                      08C5    512 ;-----------------------------------------------------------------------
                                      08C5    513
                                      08C5    514
```

```
                                08C5   516
                                08C5   517 .SBTTL  ERROR REPORTING ROUTINES
                                08C5   518
                                08C5   519 ;-------------------------------------------------------------------------------
                                08C5   520 DPERR:
                                08C5   521          $DS_BGNMESSAGE  REGMASK=<R3,R4,R5,R6,R7>
                          00F8  08C5                       .WORD   ^M<R3,R4,R5,R6,R7>              ; ENTRY MASK
      57   18 AC    14    00    EF  08C7   522          EXTZV   #0,#20,ERR$_P2(AP),R7   ; get expected data
      53    1C AC    57    CD    08CD   523          XORL3   R7,ERR$_P3(AP),R3       ; get XOR of data
                                08D2   524          $DS_PRINTB_S    FORMAT=T_DPERR,P1=ERR$_P1(AP),P2=R7,P3=ERR$_P3(AP),-
                                08D2   525                          P4=R3
                             53    DD  08D2                   PUSHL   R3
                           1C AC   DD  08D4                   PUSHL   ERR$_P3(AP)
                             57    DD  08D7                   PUSHL   R7
                           14 AC   DD  08D9                   PUSHL   ERR$_P1(AP)
                         FDD7 CF   9F  08DC                   PUSHAB  T_DPERR
                 000100E0 9F     05  FB  08E0                   CALLS   #$$N, @#DS$PRINTB
                                08E7   526          $DS_ENDMESSAGE
                             04    08E7                   RET                             ; RETURN TO DIAGNOSTIC SUPERVISOR
                                08E8   527 ;-------------------------------------------------------------------------------
                                08E8   528 ROWERR:
                                08E8   529          $DS_BGNMESSAGE  REGMASK=<R4,R5,R8,R9>
                          0330  08E8                       .WORD   ^M<R4,R5,R8,R9>                 ; ENTRY MASK
                                08EA   530          $DS_PRINTB_S    FORMAT=T_ROWERR
                         FE29 CF   9F  08EA                   PUSHAB  T_ROWERR
                 000100E0 9F     01  FB  08EE                   CALLS   #$$N, @#DS$PRINTB
                             58    01  D0  08F5   531          MOVL    #1,R8                   ; load expected data and counter
                      54    F71C CF   D0  08F8   532          MOVL    A_WCS_ADDRESS,R4        ; load initial WCS address
                      55    F743 CF   DE  08FD   533          MOVAL   A_WCS_BUF,R5            ; load address of buffer
                      59    65   58   CD  0902   534 1$:       XORL3   R8,(R5),R9              ; generate XOR of data
                                15   13  0906   535          BEQL    2$                      ; skip basic message if data is good
                                08E8   536          $DS_PRINTB_S    FORMAT=F_ROWERR1,P1=R4,P2=R8,P3=(R5),P4=R9
                             59    DD  08E8                   PUSHL   R9
                             65    DD  090A                   PUSHL   (R5)
                             58    DD  090C                   PUSHL   R8
                             54    DD  090E                   PUSHL   R4
                         FE2E CF   9F  0910                   PUSHAB  F_ROWERR1
                 000100E0 9F     05  FB  0914                   CALLS   #$$N, @#DS$PRINTB
                                11   11  091B   537          BRB     3$                      ; skip extended message
                                091D   538 2$:       $DS_PRINTX_S    FORMAT=F_ROWERR2,P1=R4,P2=R8,P3=(R5)
                             65    DD  091D                   PUSHL   (R5)
                             58    DD  091F                   PUSHL   R8
                             54    DD  0921                   PUSHL   R4
                         FE36 CF   9F  0923                   PUSHAB  F_ROWERR2
                 000100E8 9F     04  FB  0927                   CALLS   #$$N, @#DS$PRINTX
                                85   D5  092E   539 3$:       TSTL    (R5)+                   ; update R5
                             54    04  C0  0930   540          ADDL2   #4,R4                   ; update R4
                          CB 58    04  F3  0933   541          AOBLEQ  #4,R8,1$                ; br = not finished
                                0937   542          $DS_ENDMESSAGE
                             04    0937                   RET                             ; RETURN TO DIAGNOSTIC SUPERVISOR
                                0938   543 ;-------------------------------------------------------------------------------
                                0938   544 ADDR_ERR:
                                0938   545          $DS_BGNMESSAGE  REGMASK=<R4,R5,R6,R7,R8,R9>
                        03F0    0938                       .WORD   ^M<R4,R5,R6,R7,R8,R9>           ; ENTRY MASK
                                093A   546          $DS_PRINTB_S    FORMAT=T_ROWERR
```

```
          FDD9 CF   9F  093A                      PUSHAB  T_ROWERR
000100E0 9F    01   FB  093E                      CALLS   #$$N, a#DS$PRINTB
               57   D4  0945   547         CLRL    R7                      ; load expected data and counter
      54   14 AC   D0  0947   548         MOVL    ERR$_P1(AP),R4          ; load first address of row selected
          53   08   D0  094B   549         MOVL    #8,R3                   ; initialize floating address
     55   F772 CF   DE  094E   550         MOVAL   DECODED_WORDS,R5        ; load address of actual data
     56   54   53   C1  0953   551 1$:     ADDL3   R3,R4,R6                ; build address
     59   65   57   CD  0957   552         XORL3   R7,(R5),R9              ; generate XOR of data
               15   13  095B   553         BEQL    2$                      ; skip basic message if data is good
                        095D   554         $DS_PRINTB_S    FORMAT=F_ROWERR1,P1=R6,P2=R7,P3=(R5),P4=R9
               59   DD  095D                      PUSHL   R9
               65   DD  095F                      PUSHL   (R5)
               57   DD  0961                      PUSHL   R7
               56   DD  0963                      PUSHL   R6
          FDD9 CF   9F  0965                      PUSHAB  F_ROWERR1
000100E0 9F    05   FB  0969                      CALLS   #$$N, a#DS$PRINTB
               11   11  0970   555         BRB     3$                      ; skip extended message
                        0972   556 2$:     $DS_PRINTX_S    FORMAT=F_ROWERR2,P1=R6,P2=R7,P3=(R5)
               65   DD  0972                      PUSHL   (R5)
               57   DD  0974                      PUSHL   R7
               56   DD  0976                      PUSHL   R6
          FDE1 CF   9F  0978                      PUSHAB  F_ROWERR2
000100E8 9F    04   FB  097C                      CALLS   #$$N, a#DS$PRINTX
               85   D5  0983   557 3$:     TSTL    (R5)+                   ; update R5
     53   53   01   9C  0985   558         ROTL    #1,R3,R3                ; float one across address
      C6 57   0A   F3  0989   559         AOBLEQ  #10,R7,1$               ; br = not finished
                        098D   560         $DS_ENDMESSAGE
                    04  098D                      RET                     ; RETURN TO DIAGNOSTIC SUPERVISOR
                        098E   561 ;-----------------------------------------------------------------------
                        098E   562 MI_ERR:
                        098E   563         $DS_BGNMESSAGE  REGMASK=<R3,R4,R5,R6>
                  0078  098E                      .WORD   ^M<R3,R4,R5,R6>         ; ENTRY MASK
      54   14 AC   D0  0990   564         MOVL    ERR$_P1(AP),R4          ; get address of error
      55   18 AC   D0  0994   565         MOVL    ERR$_P2(AP),R5          ; get expected data
      53   1C AC   D0  0998   566         MOVL    ERR$_P3(AP),R3          ; get actual data
     56   53   55   CD  099C   567         XORL3   R5,R3,R6                ; get XOR of data
                        09A0   568         $DS_PRINTB_S    FORMAT=T_DPERR,P1=R4,P2=R5,P3=R3,P4=R6
               56   DD  09A0                      PUSHL   R6
               53   DD  09A2                      PUSHL   R3
               55   DD  09A4                      PUSHL   R5
               54   DD  09A6                      PUSHL   R4
          FD0B CF   9F  09A8                      PUSHAB  T_DPERR
000100E0 9F    05   FB  09AC                      CALLS   #$$N, a#DS$PRINTB
                        09B3   569         $DS_ENDMESSAGE
                    04  09B3                      RET                     ; RETURN TO DIAGNOSTIC SUPERVISOR
                        09B4   570 ;-----------------------------------------------------------------------
                        09B4   571 WCS_ERR:
                        09B4   572         $DS_BGNMESSAGE  REGMASK=<R3,R4,R5>
                  0038  09B4                      .WORD   ^M<R3,R4,R5>            ; ENTRY MASK
      55   14 AC   D0  09B6   573         MOVL    ERR$_P1(AP),R5          ; get actual data
          53   0F   D0  09BA   574         MOVL    #15,R3                  ; get expected data
     54   55   53   CD  09BD   575         XORL3   R3,R5,R4                ; get XOR of data
                        09C1   576         $DS_PRINTB_S    FORMAT=F_WCS_ERR,P1=R3,P2=ERR$_P1(AP),P3=R4
               54   DD  09C1                      PUSHL   R4
            14 AC   DD  09C3                      PUSHL   ERR$_P1(AP)
```

```
                53   DD  09C6                          PUSHL   R3
            FE91 CF   9F  09C8                          PUSHAB  F_WCS_ERR
000100E0    9F    04  FB  09CC                          CALLS   #$$N, a#DS$PRINTB
 0B F638    CF    04  E1  09D3    577           BBC     #V_XFC_ERR,L_FLAGS,1$   ; br = no XFC error
                       09D9    578           $DS_PRINTB_S    FORMAT=T_XFC_ERR
            FEB4 CF   9F  09D9                          PUSHAB  T_XFC_ERR
000100E0    9F    01  FB  09DD                          CALLS   #$$N, a#DS$PRINTB
                       09E4    579 1$:
                       09E4    580           $DS_ENDMESSAGE
                  04   09E4                          RET                     ; RETURN TO DIAGNOSTIC SUPERVISOR
                       09E5    581 ;-------------------------------------------------------------------------------
                       09E5    582
                       09E5    583           $DS_PAGE
```

```
                    09E5                .SBTTL  TEST 6:  WCS Memory Test
                00000000                .PSECT  TEST_006, PAGE, NOWRT
                    0014
                    0014    586 ;++
                    0014    587 ; Test description:
                    0014    588 ;
                    0014    589 ;       This test checks the WCS as a parity memory with standard memory tests.
                    0014    590 ;       These tests include floating ones and zeros on the data path, testing
                    0014    591 ;       group select logic , floating ones and zeros on the address lines and
                    0014    592 ;       testing the RAMs using the moving inversions algorithm.
                    0014    593 ;
                    0014    594 ;
                    0014    595 ;--
                    0014    596
                    0014    597         $DS_BGNTEST     <WCS,DEFAULT,ALL>
                    0014        DATA_006:
          00000000  0014                .LONG   0                       ; TEST ARGUMENT TABLE TERMINATOR
                    0018        TEST_006::
              0000  0018                .WORD   ^M<>                    ; ENTRY MASK
51  00000000'EF   D0  001A    598         MOVL    KA_PTABLE,R1            ; get address of P table
         36 A1    B5  0021    599         TSTW    KA$W_WCS(R1)            ; check for WCS present
            1C    12  0024    600         BNEQ    2$                      ; br = yes test WCS
0000FE54'EF     01  D1  0026  601         CMPL    #1,DSA$GL_PASSNO        ; ckeck for first pass
            0D    12  002D    602         BNEQ    1$                      ; br = not first pass
                    002F    603         $DS_PRINTF_S    FORMAT=T_NO_WCS
    00000665'EF     9F  002F                PUSHAB  T_NO_WCS
000100F0 9F     01  FB  0035              CALLS   #$$N, a#DS$PRINTF
                    003C    604 1$:     $DS_EXIT            TEST
          50    01  D0  003C                MOVL    #1,R0               ; NOT AN ERROR
             0385   31  003F                BRW     TEST_006_X          ; EXIT TEST 6
                    0042    605 ;2$:    MTPR    #1,#PR$_CADR            ; Disable Cache for data test 5.2
          25    00  DA  0042    606 2$:     MTPR    #0,#PR750$_CADR         ; Enable Cache for data test
    54  00000018'EF    D0  0045  607         MOVL    A_WCS_ADDRESS,R4
                    004C    608         $DS_PROBE_S     ADDRESS=(R4),LENGTH=#4,UNIT=#0
              00    DD  004C                PUSHL   #0
              04    DD  004E                PUSHL   #4
              64    9F  0050                PUSHAB  (R4)
000101A0 9F     03  FB  0052              CALLS   #3, a#DS$PROBE
            13  50  E8  0059    609         BLBS    R0,3$                   ; br = address responded
                    005C    610         $DS_ERRHARD_S   UNIT=#0,MSGADR=T_NO_RESPONCE
              00    DD  005C                PUSHL   #0
      00000634'EF   DF  005E                PUSHAL  T_NO_RESPONCE
              00    DD  0064                PUSHL   #0
              01    DD  0066                PUSHL   #$ER
                    0068            ;;; TEST 6, SUBTEST 0, ERROR 1
000100D0 9F     04  FB  0068              CALLS   #$$M, a#DS$ERRHARD
                    006F    611 3$:     $DS_CKLOOP      2$
00010040 9F   D0 AF FA  006F                CALLG   2$, a#DS$CKLOOP
                    0077    612
      00000014'EF   D4  0077    613         CLRL    L_PERM_FLAGS            ; Clear test - permanent flags at start
      0000043D'EF   16  007D    614         JSB     SIZE_WCS                ; Size up the WCS for either 1k or 2k
      0000026E'EF   16  0083    615         JSB     CLEAR_WCS               ; Clear out WCS
00000018'FF   00100000 8F   CA  0089    616         BICL2   #M_BIT20,@A_WCS_ADDRESS ; disable WCS
                    0094    617
                    0094    618         $DS_PAGE
```

```
                                0094                    .SBTTL  SUBTEST 6.1:  Data Path
                                0094    621 ;+
                                0094    622 ; Subtest description:
                                0094    623 ;
                                0094    624 ;       The 11/750 micro word is 80 bits wide. When the WCS is addressed as a
                                0094    625 ;       memory, the 80 bit micro word is divided into four 1K by 20 bit rows
                                0094    626 ;       of words. This subtest checks the data path for stuck at one, stuck at
                                0094    627 ;       zero, and shorted data lines. This is accomplished by floating a one
                                0094    628 ;       and a zero through the data path for each 20 bit row of RAMs. If an
                                0094    629 ;       error is detected it is reported with information describing the nature
                                0094    630 ;       of the error. Any errors detected in this subtest must be corrected
                                0094    631 ;       befor going on to the next subtest.
                                0094    632 ;
                                0094    633 ;
                                0094    634 ; Subtest steps:
                                0094    635 ;
                                0094    636 ;       BGNSUBTEST Data Path
                                0094    637 ;       :  Initialize flags
                                0094    638 ;       :  Initialize data pattern
                                0094    639 ;       :  REPEAT
                                0094    640 ;       :  :  REPEAT
                                0094    641 ;       :  :  :  Write pattern
                                0094    642 ;       :  :  :  Read pattern
                                0094    643 ;       :  :  :  IF pattern incorrect
                                0094    644 ;       :  :  :  THEN
                                0094    645 ;       :  :  :  :  Report error
                                0094    646 ;       :  :  :  ENDIF
                                0094    647 ;       :  :  :  Update pattern
                                0094    648 ;       :  :  : UNTIL all patterns done
                                0094    649 ;       :  :  ENDREPEAT
                                0094    650 ;       :  : UNTIL all rows done
                                0094    651 ;       :  ENDREPEAT
                                0094    652 ;       ENDSUBTEST Data Path
                                0094    653 ;
                                0094    654 ;
                                0094    655 ; Errors:
                                0094    656 ;
                                0094    657 ;
                                0094    658 ;       If an error occurs, it can be helpful to allow the program to
                                0094    659 ;       continue running to collect data from other failures wthin this subtest
                                0094    660 ;       to determine the type of failure that is occuring. An example of this
                                0094    661 ;       would be to collect a set of error reports which indicate the same bit
                                0094    662 ;       error for all four rows. This might indicate that the error is in the
                                0094    663 ;       data path and not an individual RAM error.
                                0094    664 ;
                                0094    665 ;
                                0094    666 ;-
                                0094    667
                                0094    668
                                0094    669             $DS_BGNSUB
                                0094        T6_S1::
00010030 9F   00000000'EF   FA   0094                        CALLG   $S$, a#DS$BGNSUB
         00000010'EF   D4   009F    670             CLRL    L_FLAGS                 ; initialize flags
      54 00000018'EF   D0   00A5    671             MOVL    A_WCS_ADDRESS,R4        ; load first WCS address
                  58   D4   00AC    672             CLRL    R8                      ; initialize row counter
```

```
                55   0000003C'EF    D0   00AE    673 1$:     MOVL    DATA_PATTERN,R5          ; load all zeros pattern
                               57    D4   00B5    674 2$:     CLRL    R7                       ; initialize bit counter
                  55   55    FF 8F    9C   00B7    675 3$:     ROTL    #-1,R5,R5                ; float pattern across data
               53   55    14   00    EF   00BC    676 4$:     EXTZV   #0,#20,R5,R3             ; extract the data to be written
                          64   53    D0   00C1    677         MOVL    R3,(R4)                  ; write data
                          56   64    D0   00C4    678         MOVL    (R4),R6                  ; read data
               56   56    14   00    EF   00C7    679         EXTZV   #0,#20,R6,R6             ; extract the data read
                          56   53    D1   00CC    680         CMPL    R3,R6                    ; compare data
                          25   13    CF   00CF    681         BEQL    5$                       ; br = data good
                                     00D1    682         $DS_ERRHARD_S   UNIT=#0,MSGADR=T_DATAPATH,PRLINK=DPERR,-
                                     00D1    683                         P1=R4,P2=R3,P3=R6
                               56    DD   00D1                PUSHL   R6
                               53    DD   00D3                PUSHL   R3
                               54    DD   00D5                PUSHL   R4
                     000008C5'EF     DF   00D7                PUSHAL  DPERR
                     00000691'EF     DF   00DD                PUSHAL  T_DATAPATH
                               00    DD   00E3                PUSHL   #0
                               01    DD   00E5                PUSHL   #$ER
                                     00E7        ;;; TEST 6, SUBTEST 1, ERROR 1
                  000100D0 9F    07    FB   00E7                CALLS   #$$M, a#DS$ERRHARD
                                     00EE    684         $DS_CKLOOP      4$               ; set loop for write and read
               00010040 9F    CB AF    FA   00EE                CALLG   4$, a#DS$CKLOOP
                                     00F6    685 ;5$:    AOBLEQ  #19,R7,3$                ; br = not done floating data 5.2
                     BD 57    14   F3   00F6    686 5$:     AOBLEQ  #20,R7,3$                ; br = not done floating data
            10 00000010'EF    00   E0   00FA    687         BBS     #V_PAT,L_FLAGS,6$        ; br = both data patterns done
               55   00000040'EF    D0   0102    688         MOVL    DATA_PATTERN+4,R5        ; point R5 to second pattern
               00000010'EF    01   88   0109    689         BISB2   #M_PAT,L_FLAGS           ; set data pattern done flag
                               A3   11   0110    690         BRB     2$                       ; go write second pattern
                          54   04   C0   0112    691 6$:     ADDL2   #4,R4                    ; select next row
                  00000010'EF    01   CA   0115    692         BICL2   #M_PAT,L_FLAGS           ; clear data pattern done flag
                        8E 58    03   F3   011C    693         AOBLEQ  #3,R8,1$                 ; br = not done for all rows
                                     0120    694         $DS_ENDSUB
                                     0120        T6_S1_X:
            00010038 9F    00000000'EF    FA   0120                CALLG   $S$, a#DS$ENDSUB
                                     012B    695
                                     012B    696         $DS_PAGE
```

```
                                012B                    .SBTTL  SUBTEST 6.2:  Row Select
                                012B    699 ;+
                                012B    700 ; Subtest description:
                                012B    701 ;
                                012B    702 ;       This subtest checks row select (bits 2 and 3 of the address). The WCS
                                012B    703 ;       is addressed as four 1K by 20 bit rows of words. A unique pattern is
                                012B    704 ;       written to each row, using the addresses that were tested and verrified
                                012B    705 ;       in the data path subtest. Then each location is read back to see if the
                                012B    706 ;       pattern is correct. If one of the row select lines are stuck one, stuck
                                012B    707 ;       zero or shorted together, the data will be over written in at least one
                                012B    708 ;       of the four rows. This subtest is dependant on the successful
                                012B    709 ;       completion of the data path subtest.
                                012B    710 ;
                                012B    711 ;
                                012B    712 ; Subtest steps:
                                012B    713 ;
                                012B    714 ;       BNGSUBTEST Row Select
                                012B    715 ;       :  Write data patterns
                                012B    716 ;       :  Read data patterns
                                012B    717 ;       :  IF data patterns are incorrect
                                012B    718 ;       :  :  THEN
                                012B    719 ;       :  :  Report error
                                012B    720 ;       :  ENDIF
                                012B    721 ;       ENDSUBTEST Row Select
                                012B    722 ;
                                012B    723 ;
                                012B    724 ; Errors:
                                012B    725 ;
                                012B    726 ;
                                012B    727 ;       When an error is reported, the contents of the four addresses written
                                012B    728 ;       and read will be displayed. An example of an error could be the low
                                012B    729 ;       order bit of the row select is stuck zero. This means that instead of
                                012B    730 ;       selecting row 0, 1, 2, and 3 (each written with a unique pattern), row
                                012B    731 ;       0, 1, 0, 1 will be selected. When the data is read back row 0 will have
                                012B    732 ;       pattern 3, row 1 will have pattern 4, and rows 3 and 4 will have
                                012B    733 ;       correct data. After an error has been corrected in this subtest,
                                012B    734 ;       testing must must continue with the data path subtest.
                                012B    735 ;
                                012B    736 ;-
                                012B    737         $DS_BGNSUB
                                012B            T6_S2::
00010030 9F   0000000C'EF   FA   012B                    CALLG   $S$, a#DS$BGNSUB
              00000010'EF   D4   0136    738             CLRL    L_FLAGS             ; initialize flags
              00000258'EF   16   013C    739             JSB     CLEAR_BUFFER        ; zero buffer areas
         54   00000018'EF   D0   0142    740             MOVL    A_WCS_ADDRESS,R4 ; load first test address
                 58    01   D0   0149    741             MOVL    #1,R8               ; initialize row counter
                 64    58   D0   014C    742 1$:         MOVL    R8,(R4)             ; write data
                 54    04   C0   014F    743             ADDL2   #4,R4               ; update address for next row
               F6 58    04   F3   0152    744             AOBLEQ  #4,R8,1$            ; br = not all rows done
         54   00000018'EF   D0   0156    745             MOVL    A_WCS_ADDRESS,R4 ; load first address to read
                 58    01   D0   015D    746             MOVL    #1,R8               ; initialize row counter
         55   00000044'EF   DE   0160    747             MOVAL   A_WCS_BUF,R5        ; load address of buffer for data
                 53    64   D0   0167    748 2$:         MOVL    (R4),R3             ; read data
      53   53    14    00   EF   016A    749             EXTZV   #0,#20,R3,R3        ; extract data from word written
                 85    53   D0   016F    750             MOVL    R3,(R5)+            ; put data into buffer
```

```
                 54   04   C0  0172   751          ADDL2   #4,R4              ; update address for next row
              EE 58   04   F3  0175   752          AOBLEQ  #4,R8,2$           ; br = not all rows done
                 58   01   D0  0179   753          MOVL    #1,R8              ; initialize data and row counter
        55   00000044'EF   DE  017C   754          MOVAL   A_WCS_BUF,R5       ; load address of buffer
                 58   85   D1  0183   755 3$:      CMPL    (R5)+,R8           ; check data
                      07   13  0186   756          BEQL    4$                 ; br = data error
        00000010'EF   04   C8  0188   757          BISL2   #M_ROW_ERR,L_FLAGS ; set error flag
              F0 58   04   F3  018F   758 4$:      AOBLEQ  #4,R8,3$           ; br = not all rows done
     17 00000010'EF   02   E1  0193   759          BBC     #V_ROW_ERR,L_FLAGS,5$ ; br = no error
                                019B   760          $DS_ERRHARD_S   UNIT=#0,MSGADR=T_ROW,PRLINK=ROWERR
              000008E8'EF   DF  019B                      PUSHAL  ROWERR
              000006F0'EF   DF  01A1                      PUSHAL  T_ROW
                      00   DD  01A7                      PUSHL   #0
                      01   DD  01A9                      PUSHL   #$ER
                                01AB       ;;; TEST 6, SUBTEST 2, ERROR 1
        000100D0 9F   04   FB  01AB                      CALLS   #$$M, a#DS$ERRHARD
                                01B2   761 5$:
                                01B2   762          $DS_ENDSUB
                                01B2       T6_S2_X:
  00010038 9F   0000000C'EF   FA  01B2                      CALLG   $S$, a#DS$ENDSUB
                                01BD   763
                                01BD   764          $DS_PAGE
```

```
                                01BD                    .SBTTL  SUBTEST 6.3:  Address Path
                                01BD    767 ;+
                                01BD    768 ; Subtest description:
                                01BD    769 ;
                                01BD    770 ;       This subtest checks the address path for bits stuck at one, stuck at
                                01BD    771 ;       zero and shorted together. The WCS has a ten bit address path which
                                01BD    772 ;       runs in parallel with all of the rams in all four rows. Each row is
                                01BD    773 ;       tested seperatly by writing an encoded incremental pattern to a set of
                                01BD    774 ;       addresses, reading the data back, decoding it and checking
                                01BD    775 ;       for errors. The code used is the Reed - Muller (32,6) code which allows
                                01BD    776 ;       for up to six RAM failures befor detecting an error. This method aides
                                01BD    777 ;       in distingushing RAM errors from address path errors. Floating a one
                                01BD    778 ;       across the address path makes up the set of addresses used in this
                                01BD    779 ;       subtest.
                                01BD    780 ;
                                01BD    781 ;
                                01BD    782 ; Subtest steps:
                                01BD    783 ;
                                01BD    784 ;       BGNSUBTEST Address Path
                                01BD    785 ;       :  Initialize flags
                                01BD    786 ;       :  REPEAT
                                01BD    787 ;       :  :  Write encoded data to all addresses
                                01BD    788 ;       :  :  Read encoded data from all addresses
                                01BD    789 ;       :  :  Decode data
                                01BD    790 ;       :  :  Check data
                                01BD    791 ;       :  :  IF any data errors
                                01BD    792 ;       :  :  :  THEN
                                01BD    793 ;       :  :  :  Report data path error
                                01BD    794 ;       :  :  ENDIF
                                01BD    795 ;       :  : UNTIL all four rows done
                                01BD    796 ;       :  ENDREPEAT
                                01BD    797 ;       ENDSUBTEST Address Path
                                01BD    798 ;
                                01BD    799 ;
                                01BD    800 ;-
                                01BD    801
                                01BD    802
                                01BD    803                 $DS_BGNSUB
                                01BD            T6_S3::
00010030 9F   00000018'EF   FA  01BD                        CALLG   $S$, a#DS$BGNSUB
         00000010'EF   D4   01C8    804                 CLRL    L_FLAGS                 ; init flags
                  54   D4   01CE    805                 CLRL    R4                      ; initialize row counter
      58  00000018'EF   D0   01D0    806                 MOVL    A_WCS_ADDRESS,R8        ; load first WCS address
          55    58      D0   01D7    807 1$:             MOVL    R8,R5                   ; load it in R5 too
          53    08      D0   01DA    808                 MOVL    #8,R3                   ; initialize floating address
      56  000001D4'EF   DE   01DD    809                 MOVAL   CODE_WORDS,R6           ; load address of encoded data
      57  00000144'EF   DE   01E4    810                 MOVAL   NOISY_WORDS,R7          ; load address of data buffer
          65    86      D0   01EB    811 2$:             MOVL    (R6)+,(R5)              ; write test data
          87    65      D0   01EE    812                 MOVL    (R5),(R7)+              ; read test data
    53    53    01      9C   01F1    813                 ROTL    #1,R3,R3                ; float one across address
    55    58    53      C1   01F5    814                 ADDL3   R3,R8,R5                ; build next test address
EA 53   00000020'EF   E1   01F9    815                 BBC     V_OVERFLOW_BIT,R3,2$    ; br = not finished
         0000028F'EF   16   0201    816                 JSB     RM_DECODE               ; go decode test data
                  59   D4   0207    817                 CLRL    R9                      ; init counter
      5A  000000C4'EF   DE   0209    818                 MOVAL   DECODED_WORDS,R10       ; load address of decoded words
```

```
                    8A   59    D1   0210    819 3$:     CMPL    R9,(R10)+                       ; check data
                         07    13   0213    820         BEQL    4$                              ; br = no error
              00000010'EF   02    C8   0215    821         BISL2   #M_DATA_ERR,L_FLAGS             ; set error flag
                    F0 59   0A    F3   021C    822 4$:     AOBLEQ  #10,R9,3$                       ; br = not finished checking data
           19 00000010'EF   01    E1   0220    823         BBC     #V_DATA_ERR,L_FLAGS,5$          ; br = no error
                                       0228    824         $DS_ERRHARD_S   UNIT=#0,MSGADR=T_ADR_ERR,PRLINK=ADDR_ERR,P1=R8
                         58    DD   0228                    PUSHL   R8
                  00000938'EF   DF   022A                    PUSHAL  ADDR_ERR
                  00000772'EF   DF   0230                    PUSHAL  T_ADR_ERR
                         00    DD   0236                    PUSHL   #0
                         01    DD   0238                    PUSHL   #$ER
                                       023A        ;;; TEST 6, SUBTEST 3, ERROR 1
              000100D0 9F      05   FB   023A                CALLS   #$$M, a#DS$ERRHARD
                         58    04   C0   0241    825 5$:     ADDL2   #4,R8                       ; update row select
                      8F 54    03   F3   0244    826         AOBLEQ  #3,R4,1$                    ; br = not all rows done
                                       0248    827         $DS_ENDSUB
                                       0248        T6_S3_X:
      00010038 9F   00000018'EF   FA   0248                CALLG   $S$, a#DS$ENDSUB
                                       0253    828
                                       0253    829         $DS_PAGE
```

```
0253                    .SBTTL  SUBTEST 6.4:  Moving Inversions
0253    832 ;*
0253    833 ; Subtest description:
0253    834 ;
0253    835 ;       This subtest does an exhaustive test of all RAM chips using the
0253    836 ;       moving inversions algorithem. Each address accessed in this subtest
0253    837 ;       will be read, written and then read again with data which is checked
0253    838 ;       after each read. This subtest starts at the first address and works
0253    839 ;       its way up thru WCS memory, eventually writing all locations with all
0253    840 ;       ones. Then the process is started again and is complete when all
0253    841 ;       locations have been written with all zeros. Next this is done working
0253    842 ;       from the last address to the first, both writting till the data is all
0253    843 ;       ones and then all zeros. This is done for all bit positions in all RAMS
0253    844 ;       (four bits). For each successive pass a different address bit is used
0253    845 ;       as the lease signifigant bit in counting such that every address line
0253    846 ;       is toggled at the fastest possible rate.
0253    847 ;
0253    848 ;
0253    849 ; Subtest steps:
0253    850 ;
0253    851 ;       BGNSUBTEST Moving Inversions
0253    852 ;       :  REPEAT
0253    853 ;       :  :  Set increment to 1
0253    854 ;       :  :  REPEAT
0253    855 ;       :  :  :  Initialize flags
0253    856 ;       :  :  :  Point to first entry in data table
0253    857 ;       :  :  :  Set forward direction
0253    858 ;       :  :  :  REPEAT
0253    859 ;       :  :  :  :  REPEAT
0253    860 ;       :  :  :  :  :  Set address to starting address
0253    861 ;       :  :  :  :  :  REPEAT
0253    862 ;       :  :  :  :  :  :  Read data
0253    863 ;       :  :  :  :  :  :  IF data error
0253    864 ;       :  :  :  :  :  :  :  THEN
0253    865 ;       :  :  :  :  :  :  :  Report data error
0253    866 ;       :  :  :  :  :  :  ENDIF
0253    867 ;       :  :  :  :  :  :  Write data
0253    868 ;       :  :  :  :  :  :  Read data
0253    869 ;       :  :  :  :  :  :  IF data error
0253    870 ;       :  :  :  :  :  :  :  THEN
0253    871 ;       :  :  :  :  :  :  :  Report data error
0253    872 ;       :  :  :  :  :  :  ENDIF
0253    873 ;       :  :  :  :  :  :  Update address
0253    874 ;       :  :  :  :  :  : UNTIL all addresses done
0253    875 ;       :  :  :  :  :  ENDREPEAT
0253    876 ;       :  :  :  :  :  Update data
0253    877 ;       :  :  :  :  : UNTIL all data done
0253    878 ;       :  :  :  :  ENDREPEAT
0253    879 ;       :  :  :  :  Change direction
0253    880 ;       :  :  :  : UNTIL reverse is done
0253    881 ;       :  :  :  ENDREPEAT
0253    882 ;       :  :  :  Update row
0253    883 ;       :  :  : UNTIL all rows done
0253    884 ;       :  :  ENDREPEAT
0253    885 ;       :  :  Update increment
```

```
                                0253    886 ;       :  : UNITL increment = MSB of address
                                0253    887 ;       :  ENDREPEAT
                                0253    888 ;       ENDSUBTEST Moving Inversions
                                0253    889 ;
                                0253    890 ;
                                0253    891 ;-
                                0253    892
                                0253    893
                                0253    894         $DS_BGNSUB
                                0253        T6_S4::
00010030 9F   00000024'EF   FA  0253                CALLG   $S$, a#DS$BGNSUB
0000000C'EF   0000038D'EF   DE  025E    895         MOVAL   RENTRY1,A_RETURN ; load rentry address for unexpected MC
                                0269    896         $DS_SETVEC_S    VECTOR=#SCB$L_MACHCHK,SRVADR=CHECK_MCHK
                      00    DD  0269                PUSHL   #0
              00000418'EF   DF  026B                PUSHAL  CHECK_MCHK
                      04    DD  0271                PUSHL   #SCB$L_MACHCHK
          00010160 9F   03  FB  0273                CALLS   #3, a#DS$SETVEC
              00000010'EF   D4  027A    897 TAG1:   CLRL    L_FLAGS             ; initialize flags
              00000008'EF   D4  0280    898         CLRL    L_ROW               ; start with row 0
              0000026E'EF   16  0286    899         JSB     CLEAR_WCS           ; initialize WCS
          00000004'EF   10  D0  028C    900 5$:     MOVL    #16,L_INC           ; initialize address increment
              00000350'EF   16  0293    901 10$:    JSB     SETUP_ADDR          ; go set up address table for this inc
          53  00000200'EF   DE  0299    902 20$:    MOVAL   DATA_TABLE,R3       ; setup pointer to read data
          54  00000204'EF   DE  02A0    903         MOVAL   DATA_TABLE+4,R4     ; setup pointer to write data
       09 00000010'EF   03  E1  02A7    904 30$:    BBC     #V_REVERSE,L_FLAGS,40$ ; br = doing forward
          52  00000028'EF   D0  02AF    905         MOVL    WCS_MAX_SIZE_MWORDS,R2
                                02B6    906                                     ; point offset to last address in table
                      02    11  02B6    907         BRB     50$                 ; skip
                      52    D4  02B8    908 40$:    CLRL    R2                  ; point offset to first address in table
 5B   00000000'EF   D0  02BA    909 50$:    MOVL    A_WCS_BUFFER,R11 ; get starting address of addresses
        5A   6B42   D0  02C1    910         MOVL    (R11)[R2],R10       ; load address of data
            55   6A   D0  02C5    911         MOVL    (R10),R5            ; read data
55  55    14   00   EF  02C8    912         EXTZV   #0,#20,R5,R5        ; extract data from longword
          63   55   D1  02CD    913         CMPL    R5,(R3)             ; check data read
               1D   13  02D0    914         BEQL    60$                 ; br = data good
                        02D2    915         $DS_ERRHARD_S   UNIT=#0,MSGADR=T_MI_ERR1,PRLINK=MI_ERR,P1=R10,-
                        02D2    916                         P2=R5,P3=(R3)
                      63    DD  02D2                PUSHL   (R3)
                      55    DD  02D4                PUSHL   R5
                      5A    DD  02D6                PUSHL   R10
              0000098E'EF   DF  02D8                PUSHAL  MI_ERR
              000007A0'EF   DF  02DE                PUSHAL  T_MI_ERR1
                      00    DD  02E4                PUSHL   #0
                      01    DD  02E6                PUSHL   #$ER
                                02E8            ;;; TEST 6, SUBTEST 4, ERROR 1
                                02E8                CALLS   #$$M, a#DS$ERRHARD
 000100D0 9F   07  FB  02E8
          6A   64   D0  02EF    917 60$:    MOVL    (R4),(R10)          ; write data
          55   6A   D0  02F2    918         MOVL    (R10),R5            ; read data
55  55    14   00   EF  02F5    919         EXTZV   #0,#20,R5,R5        ; extract data from longword
          64   55   D1  02FA    920         CMPL    R5,(R4)             ; check data read
               1D   13  02FD    921         BEQL    70$                 ; br = data good
                        02FF    922         $DS_ERRHARD_S   UNIT=#0,MSGADR=T_MI_ERR2,PRLINK=MI_ERR,P1=R10,-
                        02FF    923                         P2=R5,P3=(R4)
                      64    DD  02FF                PUSHL   (R4)
                      55    DD  0301                PUSHL   R5
```

```
                        5A   DD  0303                        PUSHL   R10
                0000098E'EF   DF  0305                        PUSHAL  MI_ERR
                000007D5'EF   DF  030B                        PUSHAL  T_MI_ERR2
                        00   DD  0311                        PUSHL   #0
                        02   DD  0313                        PUSHL   #$ER
                                 0315        ;;; TEST 6, SUBTEST 4, ERROR 2
          000100D0 9F   07   FB  0315                        CALLS   #$$M, a#DS$ERRHARD
                                 031C   924 70$:    $DS_BREAK
          00010058 9F   6E   FA  031C                        CALLG   (SP), a#DS$BREAK
       07 00000010'EF   03   E1  0323   925         BBC     #V_REVERSE,L_FLAGS,80$ ; br = forward direction
                   52   01   C2  032B   926         SUBL2   #1,R2            ; index to next address (reverse)
                        8A   18  032E   927         BGEQ    50$              ; br = not finished
                        0F   11  0330   928         BRB     100$             ; skip
                   52   01   C0  0332   929 80$:    ADDL2   #1,R2            ; index to next address (forward)
          00000028'EF   52   D1  0335   930         CMPL    R2,WCS_MAX_SIZE_MWORDS
                                 033C   931                                  ; finished forward
                        03   14  033C   932         BGTR    100$             ; br = finished
                      FF79   31  033E   933         BRW     50$              ; not finished
                   84   83   D1  0341   934 100$:   CMPL    (R3)+,(R4)+      ; update data
                        63   D5  0344   935         TSTL    (R3)             ; check for data done
                        03   13  0346   936         BEQL    105$             ; br = do reverse
                      FF5C   31  0348   937         BRW     30$              ; br = do forward for next data
       0A 00000010'EF   03   E0  034B   938 105$:   BBS     #V_REVERSE,L_FLAGS,108$ ; br = reverse done
          00000010'EF   08   C8  0353   939         BISL2   #M_REVERSE,L_FLAGS ; set reverse flag
                      FF3C   31  035A   940         BRW     20$              ; do reverse
00000004'EF   00000004'EF   01   9C  035D   941 108$:   ROTL    #1,L_INC,L_INC   ; shift increment
  03 00000004'EF   00000020'EF   E0  0369   942         BBS     V_OVERFLOW_BIT,L_INC,109$
                                 0375   943                                  ; br = all increments done
                      FF1B   31  0375   944         BRW     10$              ; go do another increment
          00000008'EF   04   C0  0378   945 109$:   ADDL2   #4,L_ROW         ; update row to test
                                 037F   946 ;       CMPL    L_ROW,#8         ; check for finished  5.2
          0C   00000008'EF   D1  037F   947         CMPL    L_ROW,#12        ; check for finished
                        03   14  0386   948         BGTR    110$             ; br = finished
                      FF01   31  0388   949         BRW     5$               ; br = not finished
                        1C   11  038B   950 110$:   BRB     TAG2
                                 038D   951 RENTRY1:
                                 038D   952         $DS_ERRHARD_S   UNIT=#0,MSGADR=T_CS_PARITY1
                        00   DD  038D                        PUSHL   #0
                000004D5'EF   DF  038F                        PUSHAL  T_CS_PARITY1
                        00   DD  0395                        PUSHL   #0
                        03   DD  0397                        PUSHL   #$ER
                                 0399        ;;; TEST 6, SUBTEST 4, ERROR 3
          000100D0 9F   04   FB  0399                        CALLS   #$$M, a#DS$ERRHARD
                                 03A0   953         $DS_CKLOOP      TAG1
      00010040 9F   FED6 CF   FA  03A0                        CALLG   TAG1, a#DS$CKLOOP
                   25   00   DA  03A9   954 TAG2:   MTPR    #0,#PR750$_CADR ; Re-enable cache 5.2
                                 03AC   955         $DS_CLRVEC_S    VECTOR=SCB$L_MACHCHK
                00000004'EF   DD  03AC                        PUSHL   SCB$L_MACHCHK
          00010168 9F   01   FB  03B2                        CALLS   #1, a#DS$CLRVEC
                                 03B9   956         $DS_ENDSUB
                                 03B9        T6_S4_X:
   00010038 9F   00000024'EF   FA  03B9                        CALLG   $S$, a#DS$ENDSUB
                                 03C4   957
                                 03C4   958         $DS_ENDTEST
                   50   01   D0  03C4                        MOVL    #1, R0           ; NORMAL EXIT
```

```
                    03C7        TEST_006_X::
00010058 9F   6E    FA  03C7                    CALLG   (SP), a#DS$BREAK
                    04  03CE                    RET                         ; RETURN TO TEST SEQUENCER
                        03CF    959
                        03CF    960         $DS_PAGE
```

```
                        03CF                    .SBTTL  TEST 7:  WCS Execution Test
                     00000000                   .PSECT  TEST_007, PAGE, NOWRT
                        0018
                        0018    963 ;++
                        0018    964 ; Test description:
                        0018    965 ;
                        0018    966 ;       This test checks that micro code can be executed out of writable
                        0018    967 ;       control store.
                        0018    968 ;
                        0018    969 ;--
                        0018    970
                        0018    971             $DS_BGNTEST     <WCS,DEFAULT,ALL>
                        0018        DATA_007:
                  00000000      0018                  .LONG   0                       ; TEST ARGUMENT TABLE TERMINATOR
                        001C        TEST_007::
                        0000    001C                  .WORD   ^M<>                    ; ENTRY MASK
          51    00000000'EF     D0  001E    972       MOVL    KA_PTABLE,R1            ; get address of P table
                     36 A1      B5  0025    973       TSTW    KA$W_WCS(R1)            ; check for WCS present
                        1C      12  0028    974       BNEQ    2$                      ; br = yes test WCS
          0000FE54'EF   01      D1  002A    975       CMPL    #1,DSA$GL_PASSNO        ; ckeck for first pass
                        0D      12  0031    976       BNEQ    1$                      ; br = not first pass
                        0033    977             $DS_PRINTF_S    FORMAT=T_NO_WCS
                     00000665'EF    9F  0033                    PUSHAB  T_NO_WCS
          000100F0 9F   01      FB  0039                    CALLS   #^$$N, a#DS$PRINTF
                        0040    978 1$:         $DS_EXIT        TEST
                  50    01      D0  0040                    MOVL    #1,R0           ; NOT AN ERROR
                     0150       31  0043                    BRW     TEST_007_X      ; EXIT TEST 7
                        0046    979 2$:
                        0046    980             $DS_SETVEC_S    VECTOR=#SCB$L_MACHCHK,SRVADR=CHECK_MCHK
                        00      DD  0046                    PUSHL   #0
                  00000418'EF   DF  0048                    PUSHAL  CHECK_MCHK
                        04      DD  004E                    PUSHL   #SCB$L_MACHCHK
          00010160 9F   03      FB  0050                    CALLS   #3, a#DS$SETVEC
                        0057    981             $DS_SETVEC_S    VECTOR=#SCB$L_OPCCUS,SRVADR=XFC_SERVICE,CODE=#2
                        02      DD  0057                    PUSHL   #2
                  00000410'EF   DF  0059                    PUSHAL  XFC_SERVICE
                        14      DD  005F                    PUSHL   #SCB$L_OPCCUS
          00010160 9F   03      FB  0061                    CALLS   #3, a#DS$SETVEC
                        0068    982
               00000014'EF      D4  0068    983       CLRL    L_PERM_FLAGS            ; Clear test - permanent flags at start
               0000043D'EF      16  006E    984       JSB     SIZE_WCS                ; Size up the WCS for either 1k or 2k
               0000026E'EF      16  0074    985       JSB     CLEAR_WCS               ; Clear out all of WCS
                        007A    986       $DS_PAGE
                        007A    987
                        007A    988
```

```
                                007A                    .SBTTL  SUBTEST 7.1:  WCS Entry/Exit
                                007A    991 ;+
                                007A    992 ; Subtest description:
                                007A    993 ;
                                007A    994 ;       This subtest attempts to execute from WCS, an instruction which will
                                007A    995 ;       load the "D" register with an initial value and then decrement the
                                007A    996 ;       value and write it into general purpose register R5. The XFC
                                007A    997 ;       instruction is used to execute from WCS and then the register is
                                007A    998 ;       checked for the correct results.
                                007A    999 ;
                                007A   1000 ; Subtest steps:
                                007A   1001 ;
                                007A   1002 ;       BGNSUBTEST WCS Entry/Exit
                                007A   1003 ;       :  Initialize flags
                                007A   1004 ;       :  Initialize register
                                007A   1005 ;       :  Write micro words into WCS
                                007A   1006 ;       :  Execute XFC to enter WCS
                                007A   1007 ;       :  Check register
                                007A   1008 ;       :  IF Register contents not correct
                                007A   1009 ;       :  :  THEN
                                007A   1010 ;       :  :  Report error
                                007A   1011 ;       :  ENDIF
                                007A   1012 ;       ENDSUBTEST WCS Entry/Exit
                                007A   1013 ;
                                007A   1014 ;
                                007A   1015 ;
                                007A   1016 ;-
                                007A   1017
                                007A   1018         $DS_BGNSUB
                                007A        T7_S1::
00010030 9F   00000030'EF   FA  007A                CALLG   $S$, a#DS$BGNSUB
              00000010'EF   D4  0085   1019         CLRL    L_FLAGS         ; initialize flags
              00000000'EF   D4  008B   1020         CLRL    L_COUNT         ; setup count for this subtest
0000000C'EF   000000CD'EF   DE  0091   1021         MOVAL   RENTRY2,A_RETURN ; load rentry address for unexpected MC
                   55   10   D0  009C   1022 TAG3:  MOVL    #16,R5          ; initialize test register
              0000038C'EF   16  009F   1023         JSB     LOAD_MICRO      ; load wcs with micro code and enable WCS
                            FC  00A5   1024         XFC                     ; execute instruction in WCS
                            01  00A6   1025         NOP                     ; skip a location
              00000018'FF   D4  00A7   1026         CLRL    @A_WCS_ADDRESS  ; disable WCS
                   0F   55  D1  00AD   1027         CMPL    R5,#15          ; check that register decremented twice
                        36  13  00B0   1028         BEQL    TAG4            ; br = data good
                                00B2   1029         $DS_ERRHARD_S   UNIT=#0,MSGADR=T_ENTRY_ERR,PRLINK=WCS_ERR,P1=R5
                        55  DD  00B2                PUSHL   R5
              000009B4'EF   DF  00B4                PUSHAL  WCS_ERR
              0000080A'EF   DF  00BA                PUSHAL  T_ENTRY_ERR
                        00  DD  00C0                PUSHL   #0
                        01  DD  00C2                PUSHL   #$ER
                                00C4            ;;; TEST 7, SUBTEST 1, ERROR 1
         000100D0 9F    05  FB  00C4                CALLS   #$$M, a#DS$ERRHARD
                        1B  11  00CB   1030         BRB     TAG4
                                00CD   1031 RENTRY2:
                                00CD   1032         $DS_ERRHARD_S   UNIT=#0,MSGADR=T_CS_PARITY2
                        00  DD  00CD                PUSHL   #0
              00000508'EF   DF  00CF                PUSHAL  T_CS_PARITY2
                        00  DD  00D5                PUSHL   #0
```

```
                        02   DD  00D7                          PUSHL   #$ER
                                 00D9        ;;; TEST 7, SUBTEST 1, ERROR 2
          000100D0 9F   04   FB  00D9                          CALLS   #$$M, a#DS$ERRHARD
                                 00E0  1033          $DS_CKLOOP      TAG3
       00010040 9F   B9 AF   FA  00E0                          CALLG   TAG3, a#DS$CKLOOP
                                 00E8  1034 TAG4:
              0000026E'EF   16  00E8  1035          JSB     CLEAR_WCS       ; Clear/Disable out all of WCS
                                 00EE  1036          $DS_ENDSUB
                                 00EE        T7_S1_X:
   00010038 9F   00000030'EF   FA  00EE                          CALLG   $S$, a#DS$ENDSUB
                                 00F9  1037
                                 00F9  1038          $DS_PAGE
                                 00F9  1039
                                 00F9  1040
```

```
                                00F9                    .SBTTL  SUBTEST 7.2:  WCS "Next Field" Addressing
                                00F9  1043 ;+
                                00F9  1044 ; Subtest description:
                                00F9  1045 ;
                                00F9  1046 ;       This subtest checks the WCS "next field" portion of the micro word to
                                00F9  1047 ;       insure that each bit produces the proper transfer address. This is
                                00F9  1048 ;       accomplished by filling WCS memory with micro words that decrement
                                00F9  1049 ;       general purpose register R5 and have a "next field" which points to
                                00F9  1050 ;       the next WCS location. This subtest is an extened version of the
                                00F9  1051 ;       previous subtest and runs thru all of WCS memory. An XFC instruction
                                00F9  1052 ;       is executed to execute from WCS and afterwards R5 is checked to have
                                00F9  1053 ;       the expected value.
                                00F9  1054 ;
                                00F9  1055 ; Subtest steps:
                                00F9  1056 ;
                                00F9  1057 ;       BGNSUBTEST WCS "Next Field" Addressing
                                00F9  1058 ;       :  Initialize flags
                                00F9  1059 ;       :  Initialize register
                                00F9  1060 ;       :  Write WCS with micro words for all WCS
                                00F9  1061 ;       :  Execute XFC instruction
                                00F9  1062 ;       :  Check register to have decremented properly
                                00F9  1063 ;       :  IF register contains wrong data
                                00F9  1064 ;       :  :  THEN
                                00F9  1065 ;       :  :  Report error
                                00F9  1066 ;       :  ENDIF
                                00F9  1067 ;       ENDSUBTEST WCS "Next Field" Addressing
                                00F9  1068 ;
                                00F9  1069 ;--
                                00F9  1070
                                00F9  1071          $DS_BGNSUB
                                00F9        T7_S2::
00010030 9F   0000003C'EF   FA  00F9                CALLG   $S$, a#DS$BGNSUB
              00000010'EF   D4  0104  1072          CLRL    L_FLAGS             ; initialize flags
00000000'EF   00000030'EF   D0  010A  1073          MOVL    MICRO_WORD_COUNT,L_COUNT
                            0115  1074                      ; setup count for all locations
0000000C'EF   00000155'EF   DE  0115  1075          MOVAL   RENTRY3,A_RETURN ; load rentry address for unexpected MC
        55    00000034'EF   D0  0120  1076 TAG5:    MOVL    TEST_VALUE,R5   ; initialize test register
              0000038C'EF   16  0127  1077          JSB     LOAD_MICRO          ; load wcs with micro code
                            FC  012D  1078          XFC                         ; execute instruction in WCS
                            01  012E  1079          NOP                         ; skip a location
              00000018'FF   D4  012F  1080          CLRL    aA_WCS_ADDRESS      ; disable WCS
                  0F    55  D1  0135  1081          CMPL    R5,#15              ; check that register decremented
                        36  13  0138  1082          BEQL    TAG6                ; br = data good
                            013A  1083          $DS_ERRHARD_S   UNIT=#0,MSGADR=T_NXFIELD_ERR,PRLINK=WCS_ERR,P1=R5
                        55  DD  013A                PUSHL   R5
              000009B4'EF   DF  013C                PUSHAL  WCS_ERR
              0000082F'EF   DF  0142                PUSHAL  T_NXFIELD_ERR
                        00  DD  0148                PUSHL   #0
                        01  DD  014A                PUSHL   #$ER
                            014C        ;;; TEST 7, SUBTEST 2, ERROR 1
                            014C                    CALLS   #$$M, a#DS$ERRHARD
        000100D0 9F     05  FB  014C
                        1B  11  0153  1084          BRB     TAG6
                            0155  1085 RENTRY3:
                            0155  1086          $DS_ERRHARD_S   UNIT=#0,MSGADR=T_CS_PARITY3
                        00  DD  0155                PUSHL   #0
```

```
                00000534'EF   DF  0157                      PUSHAL  T_CS_PARITY3
                          00  DD  015D                      PUSHL   #0
                          02  DD  015F                      PUSHL   #$ER
                              0161        ;;; TEST 7, SUBTEST 2, ERROR 2
            000100D0 9F   04  FB  0161                      CALLS   #$$M, a#DS$ERRHARD
                              0168  1087        $DS_CKLOOP        TAG5
          00010040 9F   B5 AF   FA  0168                      CALLG   TAG5, a#DS$CKLOOP
                              0170  1088 TAG6:
                0000026E'EF   16  0170  1089        JSB     CLEAR_WCS       ; Clear/Disable out all of WCS before exiting
                              0176  1090                                      ; this test
                              0176  1091        $DS_ENDSUB
                              0176        T7_S2_X:
    00010038 9F   0000003C'EF   FA  0176                      CALLG   $S$, a#DS$ENDSUB
                              0181  1092
                              0181  1093        $DS_CLRVEC_S    VECTOR=#SCB$L_MACHCHK
                          04  DD  0181                      PUSHL   #SCB$L_MACHCHK
            00010168 9F   01  FB  0183                      CALLS   #1, a#DS$CLRVEC
                              018A  1094        $DS_CLRVEC_S    VECTOR=#SCB$L_OPCCUS
                          14  DD  018A                      PUSHL   #SCB$L_OPCCUS
            00010168 9F   01  FB  018C                      CALLS   #1, a#DS$CLRVEC
                              0193  1095        $DS_ENDTEST
                      50  01  D0  0193                      MOVL    #1, R0          ; NORMAL EXIT
                              0196        TEST_007_X::
            00010058 9F   6E  FA  0196                      CALLG   (SP), a#DS$BREAK
                          04  019D                      RET                     ; RETURN TO TEST SEQUENCER
                              019E  1096
                              019E  1097        $DS_ENDMOD
                    00000000                            .PSECT  $TSTCNT, NOEXE, NOWRT, OVR, LONG
                00000007  0000                          .LONG   $TN
                              0004  1098        .END
```

```
$$$                             = 0000003C R     05        DS$ENDPASS                      00010010
$$ARGS                          = 0000000A                 DS$ENDSUB                       00010038
$$E                             = 00000001                 DS$ERRDEV                       000100C8
$$M                             = 00000004                 DS$ERRHARD                      000100D0
$$N                             = 00000000                 DS$ERRPREP                      00010108
$$S                             = FFFFFFFF                 DS$ERRSOFT                      000100D8
$$T1                            = 0000002C                 DS$ERRSYS                       000100C0
$ENV                            = 00000001  G              DS$ESCAPE                       00010050
$ER                             = FFFFFFFF                 DS$FREEDBGSYM                   000101B8
$MO                             = 00000001  G              DS$GETBUF                       00010120
$S$                             = 0000003C R     05        DS$GETMEM                       00010130
$ST                             = 00000000                 DS$GETTERM                      000101C8
$TN                             = 00000007                 DS$GPHARD                       00010018
ADDR_ERR                          00000938 R     01        DS$HELP                         000101B0
ADDR_SIZE                         00000024 R     01        DS$INITSCB                      00010170
ALL                             = 00000009  G              DS$INLOOP                       00010048
A_ENA_REGISTER                    00000038 R     01        DS$K_ERROR                    = 00000002
A_RETURN                          0000000C R     01        DS$K_NORMAL                   = 00000001
A_WCS_ADDRESS                     00000018 R     01        DS$K_SEVERE                   = 00000004
A_WCS_BUF                         00000044 R     01        DS$K_SUBSYS                   = 00000066
A_WCS_BUFFER                      ********   X   01        DS$K_WARNING                  = 00000000
A_WCS_ENA_ADDR                    0000001C R     01        DS$LOAD                         00010198
BASE_006                          00000000 R     03        DS$LOADPCS                      000101C0
BASE_007                          00000000 R     06        DS$MAPDBGBLOCK                  00010118
BIT...                          = 0000001A                 DS$MEMSIZE                      000101D8
CEP_FUNCTIONAL                  = 00000000                 DS$MMOFF                        00010158
CEP_REPAIR                      = 00000001                 DS$MMON                         00010150
CHECK_MCHK                        00000418 R     01        DS$MOVPHY                       00010148
CLEAR_BUFFER                      00000258 R     01        DS$MOVVRT                       00010140
CLEAR_WCS                         0000026E R     01        DS$PARSE                        000100B8
CODEVECTORS                       000001C4 R     01        DS$PRINTB                       000100E0
CODE_WORDS                        000001D4 R     01        DS$PRINTF                       000100F0
DATA_006                          00000014 R     03        DS$PRINTS                       000100F8
DATA_007                          00000018 R     06        DS$PRINTSIG                     00010100
DATA_PATTERN                      0000003C R     01        DS$PRINTX                       000100E8
DATA_TABLE                        00000200 R     01        DS$PROBE                        000101A0
DECODED_WORDS                     000000C4 R     01        DS$RELBUF                       00010128
DEFAULT                         = 00000000  G              DS$RELMEM                       00010138
DPERR                             000008C5 R     01        DS$SERVICE_DISPATCHER           000101D0
DS$ABORT                          00010020                 DS$SETIPL                       00010178
DS$ASKADR                         00010090                 DS$SETMAP                       00010188
DS$ASKDATA                        00010080                 DS$SETPRIEXV                    00010110
DS$ASKLGCL                        00010098                 DS$SETVEC                       00010160
DS$ASKSTR                         000100A0                 DS$SHOCHAN                      00010190
DS$ASKVLD                         00010088                 DS$SUMMARY                      00010028
DS$ATTACH                         000101A8                 DS$WAITMS                       00010060
DS$BGNSUB                         00010030                 DS$WAITUS                       00010068
DS$BRANCH                         000100A8                 DS$_ARITH                     = 006600D0
DS$BREAK                          00010058                 DS$_ASBE                      = 00660118
DS$CANWAIT                        00010070                 DS$_BADLINK                   = 006600F0
DS$CHANNEL                        00010180                 DS$_BADTYPE                   = 006600E8
DS$CKLOOP                         00010040                 DS$_BIIC                      = 00660120
DS$CLRVEC                         00010168                 DS$_CHME                      = 006600A8
DS$CNTRLC                         00010078                 DS$_CHMK                      = 006600E0
DS$CVTREG                         000100B0                 DS$_DEVNAME                   = 00660108
```

```
DS$_ERROR                       = 00660002
DS$_FHWE                        = 00660068
DS$_FRAGBUF                     = 00660080
DS$_ICBUSY                      = 006600C8
DS$_ICERR                       = 006600C0
DS$_IHWE                        = 00660060
DS$_ILLCHAR                     = 00660018
DS$_ILLPAGCNT                   = 00660078
DS$_ILLUNIT                     = 00660100
DS$_INSFMEM                     = 00660050
DS$_IPL2HI                      = 006600B8
DS$_IVADDR                      = 00660040
DS$_IVVECT                      = 00660038
DS$_KRNLSTK                     = 00660090
DS$_LOGIC                       = 00660070
DS$_MCHK                        = 00660088
DS$_MMOFF                       = 00660058
DS$_NEEDUNIT                    = 006600F8
DS$_NODE                        = 00660128
DS$_NOPCS                       = 00660110
DS$_NORMAL                      = 00660001
DS$_NOSUPPORT                   = 006600B1
DS$_NOTDON                      = 00660030
DS$_NOTIMP                      = 006600B0
DS$_NULLSTR                     = 00660010
DS$_OVERFLOW                    = 00660008
DS$_POWER                       = 00660098
DS$_PROGERR                     = 00660020
DS$_SEVERE                      = 00660004
DS$_TRANSL                      = 006600A0
DS$_TRUNCATE                    = 00660028
DS$_UNEXPINT                    = 006600D8
DS$_VASFULL                     = 00660048
DS$_WARNING                     = 00660000
DSA$AL_APTMAIL                    0000FE00
DSA$AT_APTTXT                     0000FA00
DSA$GL_APTCOM                     0000FE04
DSA$GL_DEVLEN                     0000FE58
DSA$GL_ERRNO                      0000FE44
DSA$GL_EVENT                      0000FE48
DSA$GL_FLAGS                      0000FE00
DSA$GL_MSGTYP                     0000FE40
DSA$GL_PASSES                     0000FE08
DSA$GL_PASSNO                     0000FE54
DSA$GL_SECTNO                     0000FE10
DSA$GL_SID                        0000FE14
DSA$GL_SUBTNO                     0000FE4C
DSA$GL_TESTNO                     0000FE50
DSA$GL_UNITS                      0000FE0C
DSA$GQ_MSGPTR                     0000FE68
DSA$GT_DEVNAM                     0000FE5C
ENV$M_DOMAIN                    = 00000002
ENV$M_LEVEL                     = 00000001
ENV$M_SUPER                     = 000003FC
ENV$S_DOMAIN                    = 00000001
ENV$S_LEVEL                     = 00000001
ENV$S_SUPER                     = 00000008
ENV$V_DOMAIN                    = 00000001
ENV$V_LEVEL                     = 00000000
ENV$V_SUPER                     = 00000002
ENV$_CPU                        = 00000000
ENV$_FUNCTIONAL                 = 00000000
ENV$_REPAIR                     = 00000001
ENV$_SUPER                      = 00000001
ENV$_SYSTEM                     = 00000001
ERR$_MSGADR                     = 0000000C
ERR$_NARGS                      = 0000000A
ERR$_NUM                        = 00000004
ERR$_P1                         = 00000014
ERR$_P2                         = 00000018
ERR$_P3                         = 0000001C
ERR$_P4                         = 00000020
ERR$_P5                         = 00000024
ERR$_P6                         = 00000028
ERR$_POINTER                    = 00000010
ERR$_UNIT                       = 00000008
F_ROWERR1                         00000742 R      01
F_ROWERR2                         0000075D R      01
F_WCS_ERR                         0000085D R      01
HALT                            = 00000004   G
HP$A_DEPENDENT                    00000032
HP$A_DEVICE                       00000018
HP$A_DVA                          0000001C
HP$A_LINK                         00000020
HP$B_DRIVE                        0000000B
HP$B_FLAGS                        0000000A
HP$Q_DEVICE                       00000000
HP$T_DEVICE                       0000000C
HP$T_TYPE                         00000026
HP$W_SIZE                         00000008
HP$W_VECTOR                       00000024
IPR                             = 00000006   G
KA$B_ACC_TYPE                     00000042   G
KA$B_NODE_ID                      00000046   G
KA$B_RESERVED                     00000043   G
KA$B_SID_TYPE                     0000003D   G
KA$K_LEN                          0000004B   G
KA$L_FLAGS                        00000032   G
KA$L_MEM_SIZE                     00000047   G
KA$L_SID                          0000003A   G
KA$M_CHAR                       = 00000100   G
KA$M_CRC                        = 00000010   G
KA$M_D_FLOAT                    = 00000002   G
KA$M_EDIT                       = 00000080   G
KA$M_F_FLOAT                    = 00000001   G
KA$M_G_FLOAT                    = 00000004   G
KA$M_H_FLOAT                    = 00000008   G
KA$M_PACKED                     = 00000020   G
KA$M_PACK_MUL                   = 00000040   G
KA$M_SB_ERR                     = 02000000   G
```

```
KA$M_TODR                       = 00010000  G
KA$M_WCS_LD                     = 01000000  G
KA$V_CHAR                       = 00000008  G
KA$V_CRC                        = 00000004  G
KA$V_D_FLOAT                    = 00000001  G
KA$V_EDIT                       = 00000007  G
KA$V_F_FLOAT                    = 00000000  G
KA$V_G_FLOAT                    = 00000002  G
KA$V_H_FLOAT                    = 00000003  G
KA$V_PACKED                     = 00000005  G
KA$V_PACK_MUL                   = 00000006  G
KA$V_SB_ERR                     = 00000019  G
KA$V_TODR                       = 00000010  G
KA$V_WCS_LD                     = 00000018  G
KA$W_LATENCY                      0000003E  G
KA$W_MEM_SIZE                     00000044  G
KA$W_PROGRESS                     00000040  G
KA$W_RESERVED                     00000038  G
KA$W_WCS                          00000036  G
KA_PTABLE                         ********    X   01
LOAD_MICRO                        0000038C  R     01
L_COUNT                           00000000  R     01
L_FLAGS                           00000010  R     01
L_INC                             00000004  R     01
L_PERM_FLAGS                      00000014  R     01
L_REV_CHECK                       ********    X   01
L_ROW                             00000008  R     01
MANUAL                          = 00000001  G
MCHK                            = 00000005  G
MICRO_DATA                        00000224  R     01
MICRO_WORD_COUNT                  00000030  R     01
MI_ERR                            0000098E  R     01
MSG_006                           00000002  R     03
MSG_007                           00000002  R     06
M_BIT19                         = 00080000
M_BIT20                         = 00100000
M_DATA_ERR                      = 00000002
M_OLD_WCS                       = 00000001
M_PAT                           = 00000001
M_REVERSE                       = 00000008
M_ROW_ERR                       = 00000004
M_XFC_ERR                       = 00000010
NOISY_WORDS                       00000144  R     01
PAR$M_ATDEF                     = 00000010
PAR$M_ATHI                      = 00000008
PAR$M_ATLO                      = 00000004
PAR$M_NODEF                     = 00000002
PAR$V_ATDEF                     = 00000004
PAR$V_ATHI                      = 00000003
PAR$V_ATLO                      = 00000002
PAR$V_NODEF                     = 00000001
PAR$_BIN                        = 00000002
PAR$_DEC                        = 0000000A
PAR$_HEX                        = 00000010
PAR$_NO                         = 00000000
PAR$_OCT                        = 00000008
PAR$_YES                        = 00000001
PCS                             = 00000008  G
POWER_FAIL                      = 00000003  G
PR$_SID                           ********    X   01
PR750$_CADR                     = 00000025
PSL$K_EXEC                      = 00000001
PSL$K_KERNEL                    = 00000000
PSL$K_SUPER                     = 00000002
PSL$K_USER                      = 00000003
PSL$M_CBIT                      = 00000001
PSL$M_NBIT                      = 00000008
PSL$M_VBIT                      = 00000002
PSL$M_ZBIT                      = 00000004
PSL$V_CBIT                      = 00000000
PSL$V_NBIT                      = 00000003
PSL$V_VBIT                      = 00000001
PSL$V_ZBIT                      = 00000002
RENTRY1                           0000038D  R     03
RENTRY2                           000000CD  R     06
RENTRY3                           00000155  R     06
RM_DECODE                         0000028F  R     01
ROWERR                            000008E8  R     01
SCB$L_ACCESS                      00000020
SCB$L_ARITH                       00000034
SCB$L_BREAK                       0000002C
SCB$L_CHME                        00000044
SCB$L_CHMK                        00000040
SCB$L_CHMS                        00000048
SCB$L_CHMU                        0000004C
SCB$L_COMPAT                      00000030
SCB$L_KNLSTK                      00000008
SCB$L_MACHCHK                     00000004
SCB$L_OPCCUS                      00000014
SCB$L_OPCDEC                      00000010
SCB$L_POWER                       0000000C
SCB$L_RADRMOD                     0000001C
SCB$L_ROPRAND                     00000018
SCB$L_RXDB                        000000F8
SCB$L_SFTLVL1                     00000084
SCB$L_SFTLVL10                    000000A8
SCB$L_SFTLVL11                    000000AC
SCB$L_SFTLVL12                    000000B0
SCB$L_SFTLVL13                    000000B4
SCB$L_SFTLVL14                    000000B8
SCB$L_SFTLVL15                    000000BC
SCB$L_SFTLVL2                     00000088
SCB$L_SFTLVL3                     0000008C
SCB$L_SFTLVL4                     00000090
SCB$L_SFTLVL5                     00000094
SCB$L_SFTLVL6                     00000098
SCB$L_SFTLVL7                     0000009C
SCB$L_SFTLVL8                     000000A0
SCB$L_SFTLVL9                     000000A4
SCB$L_TBIT                        00000028
```

```
SCB$L_TIMER                     000000C0
SCB$L_TRANSL                    00000024
SCB$L_TXDB                      000000FC
SCB$L_ZERO                      00000000
SEP_FUNCTIONAL                = 00000002
SEP_REPAIR                    = 00000003
SETUP_ADDR                      00000350 R      01
SIZ...                        = 00000001
SIZE_WCS                        0000043D R      01
SYS$ALLOC                       00010238
SYS$ASCTIM                      00010248
SYS$ASSIGN                      00010250
SYS$BINTIM                      00010258
SYS$CANCEL                      00010260
SYS$CANTIM                      00010268
SYS$CLOSE                       000105B8
SYS$CLREF                       00010298
SYS$CONNECT                     000105C0
SYS$DALLOC                      000102D8
SYS$DASSGN                      000102E0
SYS$DISCONNECT                  000105D0
SYS$FAO                         00010350
SYS$FAOL                        00010358
SYS$GET                         00010580
SYS$GETCHN                      000104C8
SYS$GETTIM                      00010378
SYS$LKWSET                      000103A0
SYS$NUMTIM                      000103B8
SYS$OPEN                        00010608
SYS$QIO                         000103C8
SYS$QIOW                        00010200
SYS$READ                        00010590
SYS$READEF                      000103D0
SYS$SETAST                      000103F8
SYS$SETEF                       00010400
SYS$SETIMR                      00010420
SYS$SETPRI                      00010428
SYS$SETPRT                      00010430
SYS$SETRWM                      00010438
SYS$SETSWM                      00010448
SYS$ULKPAG                      00010460
SYS$ULWSET                      00010468
SYS$UNWIND                      00010470
SYS$WAITFR                      00010478
SYS$WFLAND                      00010488
SYS$WFLOR                       00010490
T6_S1                           00000094 RG     03
T6_S1_X                         00000120 R      03
T6_S2                           0000012B RG     03
T6_S2_X                         000001B2 R      03
T6_S3                           000001BD RG     03
T6_S3_X                         00000248 R      03
T6_S4                           00000253 RG     03
T6_S4_X                         000003B9 R      03
T7_S1                           0000007A RG     06
T7_S1_X                         000000EE R      06
T7_S2                           000000F9 RG     06
T7_S2_X                         00000176 R      06
TAG1                            0000027A R      03
TAG2                            000003A9 R      03
TAG3                            0000009C R      06
TAG4                            000000E8 R      06
TAG5                            00000120 R      06
TAG6                            00000170 R      06
TEST_006                        00000018 RG     03
TEST_006_X                      000003C7 RG     03
TEST_007                        0000001C RG     06
TEST_007_X                      00000196 RG     06
TEST_VALUE                      00000034 R      01
TU58                          = 00000002   G
T_ADR_ERR                       00000772 R      01
T_BAD_ATTACH                    00000568 R      01
T_BAD_ATTACH2                   000005DB R      01
T_CS_PARITY1                    000004D5 R      01
T_CS_PARITY2                    00000508 R      01
T_CS_PARITY3                    00000534 R      01
T_DATAPATH                      00000691 R      01
T_DPERR                         000006B7 R      01
T_ENTRY_ERR                     0000080A R      01
T_MI_ERR1                       000007A0 R      01
T_MI_ERR2                       000007D5 R      01
T_NO_RESPONCE                   00000634 R      01
T_NO_WCS                        00000665 R      01
T_NXFIELD_ERR                   0000082F R      01
T_ROW                           000006F0 R      01
T_ROWERR                        00000717 R      01
T_XFC_ERR                       00000891 R      01
V_BIT14                       = 0000000E
V_BIT15                       = 0000000F
V_DATA_ERR                    = 00000001
V_OLD_WCS                     = 00000000
V_OVERFLOW_BIT                  00000020 R      01
V_PAT                         = 00000000
V_REVERSE                     = 00000003
V_ROW_ERR                     = 00000002
V_XFC_ERR                     = 00000004
WCS                           = 00000007   G
WCS_ERR                         000009B4 R      01
WCS_MAX_SIZE_LWORDS             0000002C R      01
WCS_MAX_SIZE_MWORDS             00000028 R      01
XFC_SERVICE                     00000410 R      01
```

Psect synopsis

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
ECKAXE	000009E5 (2533.)	01 (1.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
ABS	00010610 (67088.)	02 (2.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE
TEST_006	000003CF (975.)	03 (3.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
DISPATCH	00000030 (48.)	04 (4.)	NOPIC USR CON REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG
ARGLIST	00000048 (72.)	05 (5.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC LONG
TEST_007	0000019E (414.)	06 (6.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
$TSTCNT	00000004 (4.)	07 (7.)	NOPIC USR OVR REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG

Symbol Cross Reference

SYMBOL	VALUE	DEFINITION	REFERENCES...
$$$	=0000003C-R	1071 (15)	1018 (14) 1071 (15) 669 (9) 737 (10) 803 (11) 894 (12)
$$ARGS	=0000000A	85 (2)	85 (2)
$$E	=00000001	1071 (15)	1036 (14) 1091 (15) 694 (9) 762 (10) 827 (11) 956 (12)
$$M	=00000004	1086 (15)	1029 (14) 1032 (14) 1083 (15) 1086 (15) 597 (8) 610 (8) 683 (9) 760 (10) 824 (11) 916 (12) 923 (12) 952 (12) 971 (13)
$$N	=00000000	1086 (15)	1029 (14) 1032 (14) 1083 (15) 1086 (15) #-430 (3) #-432 (3) 525 (7) #-530 (7) 536 (7) 538 (7) #-546 (7) 554 (7) 556 (7) 568 (7) 576 (7) #-578 (7) #-603 (8) 610 (8) 683 (9) 760 (10) 824 (11) 89 (2) 916 (12) 923 (12) 952 (12) #-977 (13)
$$S	=FFFFFFFF	1095 (15)	1018 (14) 1042 (15) 1071 (15) 585 (8) 597 (8) 620 (9) 669 (9) 698 (10) 737 (10) 766 (11) 803 (11) 831 (12) 894 (12) 962 (13) 971 (13) 990 (14)
$$T1	=0000002C	85 (2)	85 (2)
$ENV	=00000001	68 (2)	
$ER	=FFFFFFFF	1095 (15)	1018 (14) #-1029 (14) #-1032 (14) 1071 (15) #-1083 (15) #-1086 (15) #-610 (8) 669 (9) #-683 (9) 737 (10) #-760 (10) 803 (11) #-824 (11) 894 (12) #-916 (12) #-923 (12) #-952 (12)
$MO	=00000001	1097 (15)	1097 (15)
S	=0000003C-R	1071 (15)	1018 (14) 1036 (14) 1071 (15) 1091 (15) 669 (9) 694 (9) 737 (10) 762 (10) 803 (11) 827 (11) 894 (12) 956 (12)
$ST	=00000000	1095 (15)	1018 (14) 1029 (14) 1032 (14) 1033 (14) 1036 (14) 1042 (15) 1071 (15) 1083 (15) 1086 (15) 1087 (15) 1091 (15) 1095 (15) 597 (8) 610 (8) 611 (8) 620 (9) 669 (9) 683 (9) 684 (9) 694 (9) 698 (10) 737 (10) 760 (10) 762 (10) 766 (11) 803 (11) 824 (11) 827 (11) 831 (12) 894 (12) 916 (12) 923 (12) 952 (12) 953 (12) 956 (12) 958 (12) 971 (13) 990 (14)
$TN	=00000007	1097 (15)	1029 (14) 1032 (14) 1042 (15) 1083 (15) 1086 (15) 1095 (15) 1097 (15) 431 (3) 433 (3) 585 (8) 597 (8) 604 (8) 610 (8) 620 (9) 683 (9) 698 (10) 760 (10) 766 (11) 824 (11) 831 (12) 916 (12) 923 (12) 952 (12) 958 (12) 962 (13) 971 (13) 978 (13) 990 (14)

```
ADDR_ERR                        00000938-R   544   (7)      824   (11)
ADDR_SIZE                       00000024-R   132   (2)    #-326   (3)    #-441   (3)
ALL                            =00000009     89   (2)      597   (8)      971   (13)
A_ENA_REGISTER                  00000038-R   150   (2)    #-442   (3)
A_RETURN                        0000000C-R    99   (2)   #-1021   (14)   #-1075   (15)   #-398   (3)   #-895   (12)
A_WCS_ADDRESS                   00000018-R   124   (2)   #-1026   (14)   #-1080   (15)   #-239   (3)   #-319   (3)
                                                         #-342   (3)    #-373   (3)    #-532   (7)   #-607   (8)
                                                         #-616   (8)    #-671   (9)    #-740   (10)  #-745   (10)
                                                         #-806   (11)
A_WCS_BUF                       00000044-R   158   (2)    228   (3)      533   (7)      747   (10)    754   (10)
A_WCS_BUFFER                    00000000-XR           #-318   (3)    #-909   (12)
A_WCS_ENA_ADDR                  0000001C-R   126   (2)   #-238   (3)    #-340   (3)
BASE_006                        00000000-R   585   (8)      597   (8)
BASE_007                        00000000-R   962   (13)     971   (13)
BIT...                         =0000001A     84   (2)       68   (2)       82   (2)       83   (2)       84   (2)
CEP_FUNCTIONAL                 =00000000     68   (2)
CEP_REPAIR                     =00000001     68   (2)       68   (2)
CHECK_MCHK                      00000418-R   390   (3)      896   (12)     980   (13)
CLEAR_BUFFER                    00000258-R   227   (3)      739   (10)
CLEAR_WCS                       0000026E-R   236   (3)     1035   (14)    1089   (15)    615   (8)     899   (12)
                                                          985   (13)
CODEVECTORS                     000001C4-R   164   (2)    #-295   (3)
CODE_WORDS                      000001D4-R   169   (2)      809   (11)
DATA_006                        00000014-R   597   (8)      597   (8)
DATA_007                        00000018-R   971   (13)     971   (13)
DATA_PATTERN                    0000003C-R   154   (2)    #-673   (9)    #-688   (9)
DATA_TABLE                      00000200-R   181   (2)      902   (12)     903   (12)
DECODED_WORDS                   000000C4-R   160   (2)    #-255   (3)      285   (3)    #-293   (3)     305   (3)
                                                          550   (7)      818   (11)
DEFAULT                        =00000000     89   (2)      597   (8)      971   (13)
DPERR                           000008C5-R   520   (7)      683   (9)
DS$ABORT                        00010020                    396   (3)
DS$BGNSUB                       00010030                   1018   (14)    1071   (15)    669   (9)     737   (10)
                                                          803   (11)     894   (12)
DS$BREAK                        00010058                   1095   (15)    924   (12)    958   (12)
DS$CKLOOP                       00010040                   1033   (14)    1087   (15)    611   (8)     684   (9)
                                                          953   (12)
DS$CLRVEC                       00010168                   1093   (15)    1094   (15)    955   (12)
DS$ENDSUB                       00010038                   1036   (14)    1091   (15)    694   (9)     762   (10)
                                                          827   (11)     956   (12)
DS$ERRHARD                      000100D0                   1029   (14)    1032   (14)    1083   (15)   1086   (15)
                                                          610   (8)      683   (9)      760   (10)    824   (11)
                                                          916   (12)     923   (12)     952   (12)
DS$K_ERROR                     =00000002     82   (2)
DS$K_NORMAL                    =00000001     82   (2)
DS$K_SEVERE                    =00000004     82   (2)
DS$K_SUBSYS                    =00000066     82   (2)       82   (2)
DS$K_WARNING                   =00000000     82   (2)
DS$PRINTB                       000100E0                    525   (7)      530   (7)      536   (7)     546   (7)
                                                          554   (7)      568   (7)      576   (7)     578   (7)
DS$PRINTF                       000100F0                    430   (3)      432   (3)      603   (8)     977   (13)
DS$PRINTSIG                     00010100                    395   (3)
DS$PRINTX                       000100E8                    538   (7)      556   (7)
DS$PROBE                        000101A0                    608   (8)
DS$SETVEC                       00010160                    896   (12)     980   (13)     981   (13)
```

```
DS$_ARITH                       =006600D0     82      (2)
DS$_ASBE                        =00660118     82      (2)
DS$_BADLINK                     =006600F0     82      (2)
DS$_BADTYPE                     =006600E8     82      (2)
DS$_BIIC                        =00660120     82      (2)
DS$_CHME                        =006600A8     82      (2)
DS$_CHMK                        =006600E0     82      (2)
DS$_DEVNAME                     =00660108     82      (2)
DS$_ERROR                       =00660002     82      (2)
DS$_FHWE                        =00660068     82      (2)
DS$_FRAGBUF                     =00660080     82      (2)
DS$_ICBUSY                      =006600C8     82      (2)
DS$_ICERR                       =006600C0     82      (2)
DS$_IHWE                        =00660060     82      (2)
DS$_ILLCHAR                     =00660018     82      (2)
DS$_ILLPAGCNT                   =00660078     82      (2)
DS$_ILLUNIT                     =00660100     82      (2)
DS$_INSFMEM                     =00660050     82      (2)
DS$_IPL2HI                      =006600B8     82      (2)
DS$_IVADDR                      =00660040     82      (2)
DS$_IVVECT                      =00660038     82      (2)
DS$_KRNLSTK                     =00660090     82      (2)
DS$_LOGIC                       =00660070     82      (2)
DS$_MCHK                        =00660088     82      (2)    #-394    (3)
DS$_MMOFF                       =00660058     82      (2)
DS$_NEEDUNIT                    =006600F8     82      (2)
DS$_NODE                        =00660128     82      (2)
DS$_NOPCS                       =00660110     82      (2)
DS$_NORMAL                      =00660001     82      (2)
DS$_NOSUPPORT                   =006600B1     82      (2)
DS$_NOTDON                      =00660030     82      (2)
DS$_NOTIMP                      =006600B0     82      (2)      82      (2)
DS$_NULLSTR                     =00660010     82      (2)
DS$_OVERFLOW                    =00660008     82      (2)
DS$_POWER                       =00660098     82      (2)
DS$_PROGERR                     =00660020     82      (2)
DS$_SEVERE                      =00660004     82      (2)
DS$_TRANSL                      =006600A0     82      (2)
DS$_TRUNCATE                    =00660028     82      (2)
DS$_UNEXPINT                    =006600D8     82      (2)
DS$_VASFULL                     =00660048     82      (2)
DS$_WARNING                     =00660000     82      (2)      82      (2)
DSA$GL_PASSNO                    0000FE54                    #-601    (8)    #-975    (13)
ENV$M_DOMAIN                    =00000002     68      (2)
ENV$M_LEVEL                     =00000001     68      (2)
ENV$M_SUPER                     =000003FC     68      (2)
ENV$S_DOMAIN                    =00000001     68      (2)
ENV$S_LEVEL                     =00000001     68      (2)
ENV$S_SUPER                     =00000008     68      (2)
ENV$V_DOMAIN                    =00000001     68      (2)      68      (2)
ENV$V_LEVEL                     =00000000     68      (2)      68      (2)
ENV$V_SUPER                     =00000002     68      (2)
ENV$_CPU                        =00000000     68      (2)      68      (2)
ENV$_FUNCTIONAL                 =00000000     68      (2)      68      (2)
ENV$_REPAIR                     =00000001     68      (2)      68      (2)
```

```
ENV$_SUPER                      =00000001      68      (2)
ENV$_SYSTEM                     =00000001      68      (2)       68      (2)
ERR$_MSGADR                     =0000000C      85      (2)
ERR$_NARGS                      =0000000A      85      (2)
ERR$_NUM                        =00000004      85      (2)
ERR$_P1                         =00000014      85      (2)     #-525     (7)     #-548     (7)     #-564     (7)     #-573     (7)
                                                               #-576     (7)
ERR$_P2                         =00000018      85      (2)       522     (7)     #-565     (7)
ERR$_P3                         =0000001C      85      (2)     #-523     (7)     #-525     (7)     #-566     (7)
ERR$_P4                         =00000020      85      (2)
ERR$_P5                         =00000024      85      (2)
ERR$_P6                         =00000028      85      (2)
ERR$_POINTER                    =00000010      85      (2)
ERR$_UNIT                       =00000008      85      (2)
F_ROWERR1                        00000742-R    486     (5)       536     (7)       554     (7)
F_ROWERR2                        0000075D-R    489     (5)       538     (7)       556     (7)
F_WCS_ERR                        0000085D-R    507     (5)       576     (7)
HALT                            =00000004      89      (2)
IPR                             =00000006      89      (2)
KA$W_WCS                         00000036                       417     (3)     #-599     (8)     #-973     (13)
KA_PTABLE                        00000000-XR                  #-416     (3)     #-598     (8)     #-972     (13)
LOAD_MICRO                       0000038C-R    338     (3)      1023     (14)      1077     (15)
L_COUNT                          00000000-R     96     (2)     #-1020    (14)     #-1073    (15)     #-229     (3)     #-231     (3)
                                                               #-240     (3)     #-243     (3)     #-350     (3)     #-369     (3)
L_FLAGS                          00000010-R    101     (2)     #-1019    (14)     #-1072    (15)     #-381     (3)       577     (7)
                                                               #-670     (9)       687     (9)     #-689     (9)     #-692     (9)
                                                               #-738     (10)    #-757     (10)      759     (10)    #-804     (11)
                                                               #-821     (11)      823     (11)    #-897     (12)      904     (12)
                                                                 925     (12)      938     (12)    #-939     (12)
L_INC                            00000004-R     97     (2)     #-317     (3)     #-900     (12)    #-941     (12)      942     (12)
L_PERM_FLAGS                     00000014-R    114     (2)       237     (3)       339     (3)     #-415     (3)       422     (3)
                                                               #-613     (8)     #-983     (13)
L_REV_CHECK                      00000000-XR                  #-413     (3)
L_ROW                            00000008-R     98     (2)     #-320     (3)     #-898     (12)    #-945     (12)    #-947     (12)
MANUAL                          =00000001      89      (2)
MCHK                            =00000005      89      (2)
MICRO_DATA                       00000224-R    192     (2)       343     (3)
MICRO_WORD_COUNT                 00000030-R    140     (2)     #-1073    (15)    #-439     (3)
MI_ERR                           0000098E-R    562     (7)       916     (12)      923     (12)
MSG_006                          00000002-R    585     (8)       597     (8)
MSG_007                          00000002-R    962     (13)      971     (13)
M_BIT19                         =00080000      121     (2)     #-358     (3)
M_BIT20                         =00100000      122     (2)     #-373     (3)     #-616     (8)
M_DATA_ERR                      =00000002      106     (2)     #-821     (11)
M_OLD_WCS                       =00000001      117     (2)     #-415     (3)
M_PAT                           =00000001      104     (2)     #-689     (9)     #-692     (9)
M_REVERSE                       =00000008      110     (2)     #-939     (12)
M_ROW_ERR                       =00000004      108     (2)     #-757     (10)
M_XFC_ERR                       =00000010      112     (2)     #-381     (3)
NOISY_WORDS                      00000144-R    162     (2)     #-263     (3)     #-291     (3)       810     (11)
PAR$M_ATDEF                     =00000010      83      (2)
PAR$M_ATHI                      =00000008      83      (2)
PAR$M_ATLO                      =00000004      83      (2)
PAR$M_NODEF                     =00000002      83      (2)
PAR$V_ATDEF                     =00000004      83      (2)
```

```
PAR$V_ATHI                      =00000003      83      (2)
PAR$V_ATLO                      =00000002      83      (2)
PAR$V_NODEF                     =00000001      83      (2)
PAR$_BIN                        =00000002      83      (2)
PAR$_DEC                        =0000000A      83      (2)
PAR$_HEX                        =00000010      83      (2)
PAR$_NO                         =00000000      83      (2)
PAR$_OCT                        =00000008      83      (2)
PAR$_YES                        =00000001      83      (2)
PCS                             =00000008      89      (2)
POWER_FAIL                      =00000003      89      (2)
PR$_SID                          00000000-XR                    #-411     (3)
PR750$_CADR                     =00000025                       #-606     (8)     #-954     (12)
PSL$K_EXEC                      =00000001      84      (2)
PSL$K_KERNEL                    =00000000      84      (2)
PSL$K_SUPER                     =00000002      84      (2)
PSL$K_USER                      =00000003      84      (2)
PSL$M_CBIT                      =00000001      84      (2)
PSL$M_NBIT                      =00000008      84      (2)
PSL$M_VBIT                      =00000002      84      (2)
PSL$M_ZBIT                      =00000004      84      (2)
PSL$V_CBIT                      =00000000      84      (2)
PSL$V_NBIT                      =00000003      84      (2)
PSL$V_VBIT                      =00000001      84      (2)
PSL$V_ZBIT                      =00000002      84      (2)
RENTRY1                          0000038D-R    951     (12)      895     (12)
RENTRY2                          000000CD-R    1031    (14)      1021    (14)
RENTRY3                          00000155-R    1085    (15)      1075    (15)
RM_DECODE                        0000028F-R    251     (3)       816     (11)
ROWERR                           000008E8-R    528     (7)       760     (10)
SCB$L_MACHCHK                    00000004                       #-1093    (15)     #-896     (12)     #-955     (12)     #-980     (13)
SCB$L_OPCCUS                     00000014                       #-1094    (15)     #-981     (13)
SEP_FUNCTIONAL                  =00000002      68      (2)
SEP_REPAIR                      =00000003      68      (2)
SETUP_ADDR                       00000350-R    316     (3)       901     (12)
SIZ...                          =00000001      84      (2)       68      (2)       83      (2)       84      (2)
SIZE_WCS                         0000043D-R    410     (3)       614     (8)       984     (13)
T6_S1                            00000094-R    669     (9)
T6_S1_X                          00000120-R    694     (9)
T6_S2                            0000012B-R    737     (10)
T6_S2_X                          000001B2-R    762     (10)
T6_S3                            000001BD-R    803     (11)
T6_S3_X                          00000248-R    827     (11)
T6_S4                            00000253-R    894     (12)
T6_S4_X                          000003B9-R    956     (12)
T7_S1                            0000007A-R    1018    (14)
T7_S1_X                          000000EE-R    1036    (14)
T7_S2                            000000F9-R    1071    (15)
T7_S2_X                          00000176-R    1091    (15)
TAG1                             0000027A-R    897     (12)      953     (12)
TAG2                             000003A9-R    954     (12)    #-950     (12)
TAG3                             0000009C-R    1022    (14)      1033    (14)
TAG4                             000000E8-R    1034    (14)    #-1028    (14)     #-1030    (14)
TAG5                             00000120-R    1076    (15)      1087    (15)
TAG6                             00000170-R    1088    (15)    #-1082    (15)     #-1084    (15)
```

```
TEST_006                        00000018-R   597    (8)      597    (8)
TEST_006_X                      000003C7-R   958    (12)   #-431    (3)    #-433    (3)    #-604    (8)
TEST_007                        0000001C-R   971    (13)     971    (13)
TEST_007_X                      00000196-R   1095   (15)   #-978    (13)
TEST_VALUE                      00000034-R   144    (2)    #-1076   (15)   #-440    (3)
TU58                            =00000002    89     (2)
T_ADR_ERR                       00000772-R   492    (5)      824    (11)
T_BAD_ATTACH                    00000568-R   460    (5)      430    (3)
T_BAD_ATTACH2                   000005DB-R   464    (5)      432    (3)
T_CS_PARITY1                    000004D5-R   451    (5)      952    (12)
T_CS_PARITY2                    00000508-R   454    (5)      1032   (14)
T_CS_PARITY3                    00000534-R   457    (5)      1086   (15)
T_DATAPATH                      00000691-R   474    (5)      683    (9)
T_DPERR                         000006B7-R   477    (5)      525    (7)      568    (7)
T_ENTRY_ERR                     0000080A-R   501    (5)      1029   (14)
T_MI_ERR1                       000007A0-R   495    (5)      916    (12)
T_MI_ERR2                       000007D5-R   498    (5)      923    (12)
T_NO_RESPONCE                   00000634-R   468    (5)      610    (8)
T_NO_WCS                        00000665-R   471    (5)      603    (8)      977    (13)
T_NXFIELD_ERR                   0000082F-R   504    (5)      1083   (15)
T_ROW                           000006F0-R   480    (5)      760    (10)
T_ROWERR                        00000717-R   483    (5)      530    (7)      546    (7)
T_XFC_ERR                       00000891-R   510    (5)      578    (7)
V_BIT14                         =0000000E    119    (2)
V_BIT15                         =0000000F    120    (2)    #-434    (3)
V_DATA_ERR                      =00000001    105    (2)    #-823    (11)
V_OLD_WCS                       =00000000    116    (2)    #-237    (3)    #-339    (3)    #-422    (3)
V_OVERFLOW_BIT                   00000020-R  128    (2)    #-323    (3)    #-434    (3)    #-815    (11)   #-942    (12)
V_PAT                           =00000000    103    (2)    #-687    (9)
V_REVERSE                       =00000003    109    (2)    #-904    (12)   #-925    (12)   #-938    (12)
V_ROW_ERR                       =00000002    107    (2)    #-759    (10)
V_XFC_ERR                       =00000004    111    (2)    #-577    (7)
WCS                             =00000007    89     (2)      597    (8)      971    (13)
WCS_ERR                          000009B4-R  571    (7)      1029   (14)     1083   (15)
WCS_MAX_SIZE_LWORDS              0000002C-R  137    (2)    #-243    (3)    #-437    (3)
WCS_MAX_SIZE_MWORDS              00000028-R  134    (2)    #-435    (3)    #-905    (12)   #-930    (12)
XFC_SERVICE                      00000410-R  380    (3)      981    (13)
```

Macros Cross Reference

MACRO	SIZE	DEFINITION	REFERENCES...
$D1_ABPROGRAM	1	396 (3)	396 (3)
$D1_BSUBT	1	669 (9)	1018 (14) 1071 (15) 669 (9) 737 (10) 803 (11) 894 (12)
$D1_BTEST	1	597 (8)	597 (8) 971 (13)
$D1_ERR	1	610 (8)	1029 (14) 1032 (14) 1083 (15) 1086 (15) 610 (8) 683 (9) 760 (10) 824 (11) 916 (12) 923 (12) 952 (12)
$D1_ERR_S	1	610 (8)	1029 (14) 1032 (14) 1083 (15) 1086 (15) 610 (8) 683 (9) 760 (10) 824 (11) 916 (12) 923 (12) 952 (12)
$D1_ESUBT	1	694 (9)	1036 (14) 1091 (15) 694 (9) 762 (10) 827 (11) 956 (12)
$D1_ETEST	1	958 (12)	1095 (15) 958 (12)
$D1_EXTEST	1	431 (3)	431 (3) 433 (3) 604 (8) 978 (13)
$D1_PRINT_S	1	430 (3)	430 (3) 432 (3) 525 (7) 530 (7) 536 (7) 538 (7) 546 (7) 554 (7) 556 (7) 568 (7) 576 (7) 578 (7) 603 (8) 977 (13)
$D1_SBTTL	2	585 (8)	1042 (15) 585 (8) 620 (9) 698 (10) 766 (11) 831 (12) 962 (13) 990 (14)
$D2_BDATA	1	597 (8)	597 (8) 971 (13)
$D2_BTEST	1	597 (8)	597 (8) 971 (13)
$D2_SBTTL	1	585 (8)	585 (8) 962 (13)
$DEF	1	84 (2)	
$DEFINI	1	80 (2)	80 (2) 81 (2) 84 (2) 86 (2) 87 (2) 88 (2) 90 (2)
$DS_ABORT	1	396 (3)	396 (3)
$DS_BGNMESSAGE	1	521 (7)	521 (7) 529 (7) 545 (7) 563 (7) 572 (7)
$DS_BGNMOD	1	68 (2)	68 (2)
$DS_BGNSUB	1	669 (9)	1018 (14) 1071 (15) 669 (9) 737 (10) 803 (11) 894 (12)
$DS_BGNTEST	1	597 (8)	597 (8) 971 (13)
$DS_BREAK	1	924 (12)	1095 (15) 924 (12) 958 (12)
$DS_CKLOOP	1	611 (8)	1033 (14) 1087 (15) 611 (8) 684 (9) 953 (12)
$DS_CLRVEC_S	1	955 (12)	1093 (15) 1094 (15) 955 (12)
$DS_DSADEF	5	81 (2)	81 (2)
$DS_DSDEF	2	82 (2)	82 (2)
$DS_DSSDEF	8	86 (2)	86 (2)
$DS_ENDDATA	1	597 (8)	597 (8) 971 (13)
$DS_ENDMESSAGE	1	526 (7)	526 (7) 542 (7) 560 (7) 569 (7) 580 (7)
$DS_ENDMOD	1	1097 (15)	1097 (15)
$DS_ENDSUB	1	694 (9)	1036 (14) 1091 (15) 694 (9) 762 (10) 827 (11) 956 (12)
$DS_ENDTEST	1	958 (12)	1095 (15) 958 (12)
$DS_ENVDEF	2	68 (2)	68 (2)
$DS_ERRDEF	1	85 (2)	85 (2)
$DS_ERRHARD_S	1	610 (8)	1029 (14) 1032 (14) 1083 (15) 1086 (15) 610 (8) 682 (9) 760 (10) 824 (11) 915 (12) 922 (12) 952 (12)

```
$DS_EXIT            1       431     (3)     431     (3)     433     (3)     604     (8)     978     (13)
$DS_HPODEF          2       87      (2)     87      (2)
$DS_KA_DEF          3       88      (2)     88      (2)
$DS_PAGE            1       583     (7)     1038    (14)    583     (7)     618     (8)     696     (9)     764     (10)
                                            829     (11)    960     (12)    986     (13)
$DS_PARDEF          1       83      (2)     83      (2)
$DS_PRINTB_S        1       524     (7)     524     (7)     530     (7)     536     (7)     546     (7)     554     (7)
                                            568     (7)     576     (7)     578     (7)
$DS_PRINTF_S        1       430     (3)     430     (3)     432     (3)     603     (8)     977     (13)
$DS_PRINTSIG_G      1       395     (3)     395     (3)
$DS_PRINTX_S        1       538     (7)     538     (7)     556     (7)
$DS_PROBE_S         1       608     (8)     608     (8)
$DS_PSLDEF          1       84      (2)     84      (2)
$DS_SBTTL           1       585     (8)     1042    (15)    585     (8)     620     (9)     698     (10)    766     (11)
                                            831     (12)    962     (13)    990     (14)
$DS_SCBDEF          3       80      (2)     80      (2)
$DS_SECDEF          1       89      (2)     89      (2)
$DS_SETVEC_S        1       896     (12)    896     (12)    980     (13)    981     (13)
$EQU                1       84      (2)     68      (2)     82      (2)     83      (2)     84      (2)
$EQULS1             1       84      (2)     68      (2)     82      (2)     84      (2)
$EQULST             1       68      (2)     68      (2)     82      (2)     84      (2)
$GBLINI             2       68      (2)     68      (2)     82      (2)     83      (2)     84      (2)
$OFFDEF             1       85      (2)     85      (2)
$PR750DEF           1       90      (2)     90      (2)
$PSLDEF             2       84      (2)     84      (2)
$PUSHADR            1       610     (8)     1029    (14)    1032    (14)    1083    (15)    1086    (15)    610     (8)
                                            683     (9)     760     (10)    824     (11)    916     (12)    923     (12)
                                            952     (12)
$VIELD              1       68      (2)     68      (2)     83      (2)     84      (2)
$VIELD1             1       84      (2)     68      (2)     83      (2)     84      (2)
ECKAX_SECDEF        1       89      (2)     89      (2)
```

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	30	00:00:00.07	00:00:00.54
Command processing	897	00:00:00.69	00:00:01.23
Pass 1	1317	00:00:12.68	00:00:23.43
Symbol table sort	0	00:00:00.57	00:00:01.09
Pass 2	603	00:00:03.19	00:00:07.32
Symbol table output	54	00:00:00.22	00:00:00.48
Psect synopsis output	5	00:00:00.03	00:00:00.03
Cross-reference output	40	00:00:01.08	00:00:02.57
Assembler run totals	2949	00:00:18.53	00:00:36.69

The working set limit was 2612 pages.
173596 bytes (340 pages) of virtual memory were used to buffer the intermediate code.
There were 30 pages of symbol table space allocated to hold 548 non-local and 77 local symbols.
1098 source lines were read in Pass 1, producing 33 object records in Pass 2.
130 pages of virtual memory were used to define 57 macros.

```
                                        +---------------------------+
                                        ! Macro library statistics !
                                        +---------------------------+

Macro library name                          Macros defined
------------------                          --------------
DISK$DIAGPACK02:[TAYLOR.ECKAX]ECKAX.MLB;1              1
SYS$COMMON:[SYSLIB]DIAG.MLB;955                       47
SYS$COMMON:[SYSLIB]STARLET.MLB;2                       9
TOTALS (all libraries)                                57

897 GETS were required to define 57 macros.

There were no errors, warnings or information messages.

MACRO/LIS=ECKAX5.LIS/CROSS ECKAX5
```

Table of contents

(1) 1 ECKAX6: MACHINE CHECK EXCEPTIONS AND INTERRUPTS
(3) 61 DECLARATIONS
(4) 158 ERROR MESSAGES
(5) 252 DATA TABLES
(8) 333 ERROR REPORTING ROUTINE
(9) 424 SUBROUTINES
(10) 645 TEST 8: Machine Check Exceptions and Interrupts
(11) 659 SUBTEST 8.1: Bus Error ABORT
(12) 736 SUBTEST 8.2: Write Bus Error INTERRUPT
(13) 813 SUBTEST 8.3: WCS Parity Error ABORT

```
                        1          .SBTTL  ECKAX6: MACHINE CHECK EXCEPTIONS AND INTERRUPTS
                        2          .TITLE  ECKAX6  VAX-11/750 Specific CPU Cluster Exerciser
                        3          .IDENT  /5.2/
                        4
                        5 ;
                        6 ; Copyright (C) 1980,1983,1986
                        7 ; Digital Equipment Corporation, Maynard, Massachusetts 01754
                        8 ;
                        9 ; This software is furnished  under a license for use only on a single
                       10 ; computer  system and  may be  copied only with  the inclusion of the
                       11 ; above copyright notice.  This software, or any other copies thereof,
                       12 ; may not be provided or  otherwise made available to any other person
                       13 ; except for use on such system and to one who agrees to these license
                       14 ; terms.  Title to and  ownership of the  software  shall at all times
                       15 ; remain in DEC.
                       16 ;
                       17 ; The information in this software is subject to change without notice
                       18 ; and should  not be construed  as a commitment  by Digital  Equipment
                       19 ; Corporation.
                       20 ;
                       21 ; DEC assumes  no  responsibility  for  the use or  reliability of its
                       22 ; software on equipment which is not supplied by DEC.
                       23 ;
                       24
                       25 ;++
                       26 ; Facility:     VAX Architecture Diagnostic.
                       27 ;
                       28 ; Abstract:     This module tests most of the possible ways in which a machine
                       29 ;               check exception or interrupt may occure.  If WCS is available,
                       30 ;               it is used to force some of the machine checks.
                       31 ;
                       32 ; Environment:  VAX Diagnostic Supervisor.
                       33 ;
                       34 ; Author:       Fred Roemer     19-Feb-81       Version 2.2
                       35 ;
                       36 ;       NO CHANGES TO THIS MODULE FOR VERSION 3.3 (DOCUMENT CHANGE ONLY)
                       37 ;
                       38 ;
                       39 ;       Dan Milleville  19-Mar-82               Version 3.4
                       40 ;       Changed Test 3 exit code to accomodate temporarily a hardware problem.
                       41 ;
                       42 ;       Dave Shull      30-Nov-82               Version 4.0
                       43 ;       Added tests 13 and 14 for coverage of PCS module.
                       44 ;
                       45 ;       Tai-Chun Pan    04-Mar-83               Version 5.0
                       46 ;       Added test 5 for coverage of Processor Halts Architecture Undefined.
                       47 ;       Added tests 11 and 12 for coverage of new ROM with MRSP of TU58.
                       48 ;
                       49 ;       Wayne R. Taylor February 1986           Version 5.2
                       50 ;       Redefined IPR's to jive with starlet.
                       51 ;       Modified the code for problem report Eckax5 where:
                       52 ;               Tests 6 & 13 tests with cache off.
                       53 ;               Subtest 1 does not check bit 0 of the memory under test.
                       54 ;               Subtest 4 tests row 0, 1, 2, but not row 3.
                       55 ;       Modifications were supplied by the submitter.
```

```
0000     56 ;       Search on 5.2.
0000     57 ;
0000     58 ;--
```

```
                     0000     60
                     0000     61          .SBTTL  DECLARATIONS
                     0000     62          .LIST   MEB
                     0000     63          .NLIST  CND
                00000000     64          .PSECT  ECKAXF, PAGE, NOWRT
                     0000     65          .LIBRARY        "SYS$LIBRARY:DIAG"; VAX family diagnostic library.
                     0000     66          $DS_BGNMOD      CEP_REPAIR, TN=8
                     0000          :::    Macro-32 Diagnostic macro library Version 8.3 "DIAG.MLB (245)"
                     0000     67
                     0000     68 ;
                     0000     69 ; Include files:
                     0000     70 ;
                     0000     71
                     0000     72          .LIBRARY        "ECKAX"         ; CPU Cluster Exerciser library.
                     0000     73
                     0000     74
                     0000     78
                     0000     79          $DS_SCBDEF
                     0000     80          $DS_DSDEF
                     0000     81          $DS_DSADEF
                     0000     82          $DS_DSSDEF
                     0000     83          $DS_ERRDEF
                     0000     84          $DS_PARDEF
                     0000     85          $DS_PSLDEF
                     0000     86          $DS_HPODEF
                     0000     87          $DS_KA_DEF
                     0000     88          ECKAX_SECDEF
                     0000     89          $PR750DEF       ;5.2
                     0000     90
                     0000     91 ;
                     0000     92 ; Own storage:
                     0000     93 ;
                     0000     94
                     0000     95
00000004             0000     96 L_COUNT:          .BLKL          ; used as a counter
00000008             0004     97 L_ADDRESS:        .BLKL          ; used to temporary store addresses
0000000C             0008     98 L_CUR_ISP:        .BLKL          ; used to store initial ISP
00000010             000C     99 RENTRY_POINT:     .BLKL          ; used to store rentry address
00000014             0010    100 L_EXP_MOD:        .BLKL          ; temp storage of expected mode
00000018             0014    101 L_EXP_STACK:      .BLKL          ; temp storage of expected stack
0000001C             0018    102                   .BLKL
00000020             001C    103 L_TIMER:          .BLKL          ; used as a timer for interrupts
                     0020    104
00000024             0020    105 L_FLAGS:          .BLKL          ; contains the following flags
                     0024    106                                  ; bit positions and masks
00000000             0024    107 V_READY=0                        ; ready to execute flag
00000001             0024    108 M_READY=1@0                      ;
00000001             0024    109 V_DONE=1                         ; restart done flag
00000002             0024    110 M_DONE=1@1                       ;
00000002             0024    111 V_EXECUTE_ERR=2                  ; execution error flag
00000004             0024    112 M_EXECUTE_ERR=1@2                ;
00000003             0024    113 V_TIMER=3                        ; timer interrupt flag
00000008             0024    114 M_TIMER=1@3                      ;
00000004             0024    115 V_FATAL_ERR=4                    ; flag fatal error
00000010             0024    116 M_FATAL_ERR=1@4                  ;
```

```
00000005  0024   117 V_PSL_ERR=5                          ; flag PSL error
00000020  0024   118 M_PSL_ERR=1@5                        ;
00000006  0024   119 V_GPR_ERR=6                          ; flag GPR error
00000040  0024   120 M_GPR_ERR=1@6                        ;
00000007  0024   121 V_ERROR_FLAG=7                       ; flag any error
00000080  0024   122 M_ERROR_FLAG=1@7                     ;
00000008  0024   123 V_KSP_ERR=8                          ; flag KSP error
00000100  0024   124 M_KSP_ERR=1@8                        ;
00000009  0024   125 V_ISP_ERR=9                          ; flag ISP error
00000200  0024   126 M_ISP_ERR=1@9                        ;
0000000A  0024   127 V_SP_ERR=10                          ; flag SP error
00000400  0024   128 M_SP_ERR=1@10                        ;
0000000B  0024   129 V_ISTK=11                            ; flag IS
00000800  0024   130 M_ISTK=1@11                          ;
0000000C  0024   131 V_MC_ERR=12                          ; flag machine check error
00001000  0024   132 M_MC_ERR=1@12                        ;
0000000D  0024   133 V_INT=13                             ; flag interrupt
00002000  0024   134 M_INT=1@13                           ;
0000000E  0024   135 V_MCINT=14                           ; flag machine check interrupt
00004000  0024   136 M_MCINT=1@14                         ;
0000000F  0024   137 V_XFC_ERR=15                         ; flag unexpected XFC exception
00008000  0024   138 M_XFC_ERR=1@15
          0024   139
00080000  0024   140 M_BIT19=1@19
00100000  0024   141 M_BIT20=1@20
00000080  0024   142 BUFSIZ=128                           ; buffer size
00000060  0024   143 SCB$L_WTBUSERR=^X60                  ; write bus error interrupt vector
FFFFFFFC  0024   144 A_LAST_ADDRESS=-4                    ; address for nonexistent memory
00000000  0024   145 L_DATA=0                             ; data used to write nonexistent mem.
          0024   146
          0024   147
00F00000  0024   148 A_WCS_ADDRESS:  .LONG   ^XF00000     ; starting address of wcs
          0028   149
00F0C000  0028   150 A_WCS_ENA_ADDR: .LONG   ^XF0C000     ; address of WCS enable register
          002C   151
          002C   152
          002C   156
```

```
                                002C   158 .SBTTL  ERROR MESSAGES
                                002C   159 ;-----------------------------------------------------------------------
                                002C   160 T_MC_MESS:
20 64 65 74 70 6D 65 74 74 41 20 00'    002C   161         .ASCIC  " Attempted to cause a Machine Check by!/"
4D 20 61 20 65 73 75 61 63 20 6F 74     0038
6B 63 65 68 43 20 65 6E 69 68 63 61     0044
                  2F 21 79 62 20        0050
                                28      002C
                                0055   162 ;-----------------------------------------------------------------------
                                0055   163 T_BUSERR:
20 61 20 67 6E 69 64 61 65 72 20 00'    0055   164         .ASCIC  " reading a nonexistent memory location!/!/"
20 74 6E 65 74 73 69 78 65 6E 6F 6E     0061
74 61 63 6F 6C 20 79 72 6F 6D 65 6D     006D
               2F 21 2F 21 6E 6F 69     0079
                                2A      0055
                                0080   165 ;-----------------------------------------------------------------------
                                0080   166 T_WTBUSERR:
6F 74 20 67 6E 69 74 69 72 77 20 00'    0080   167         .ASCIC  " writing to a nonexistent memory locaion!/!/"
65 74 73 69 78 65 6E 6F 6E 20 61 20     008C
6F 6C 20 79 72 6F 6D 65 6D 20 74 6E     0098
         2F 21 2F 21 6E 6F 69 61 63     00A4
                                2C      0080
                                00AD   168 ;-----------------------------------------------------------------------
                                00AD   169 T_WCS_ERR:
20 67 6E 69 74 75 63 65 78 65 20 00'    00AD   170         .ASCIC  " executing out of WCS with bad parity!/!/"
77 20 53 43 57 20 66 6F 20 74 75 6F     00B9
69 72 61 70 20 64 61 62 20 68 74 69     00C5
               2F 21 2F 21 79 74        00D1
                                29      00AD
                                00D7   171 ;-----------------------------------------------------------------------
                                00D7   172 T_MC_ERR:
6D 20 6E 69 20 72 6F 72 72 45 20 00'    00D7   173         .ASCIC  " Error in machine check logout stack!/"-
6B 63 65 68 63 20 65 6E 69 68 63 61     00E3
63 61 74 73 20 74 75 6F 67 6F 6C 20     00EF
21 3A 4C 41 55 54 43 41 20 2F 21 6B     00FB
                                2F      0107
                                30      00D7
                                0108   174                     " ACTUAL:!/"
                                0108   175 ;-----------------------------------------------------------------------
                                0108   176 T_EXPECTED:
21 3A 44 45 54 43 45 50 58 45 20 00'    0108   177         .ASCIC  " EXPECTED:!/"
                                2F      0114
                                0C      0108
                                0115   178 ;-----------------------------------------------------------------------
                                0115   179 T_UNEXP_DATA:
64 65 74 63 65 70 78 65 6E 55 20 00'    0115   180         .ASCIC  " Unexpected data in machine check logout information"
63 61 6D 20 6E 69 20 61 74 61 64 20     0121
6C 20 6B 63 65 68 63 20 65 6E 69 68     012D
6D 72 6F 66 6E 69 20 74 75 6F 67 6F     0139
                  6E 6F 69 74 61        0145
                                34      0115
                                014A   181 ;-----------------------------------------------------------------------
                                014A   182 T_NOT_READY:
72 74 73 6E 69 20 74 73 65 54 20 00'    014A   183         .ASCIC  " Test instruction was not ready to be executed.!/"
6E 20 73 61 77 20 6E 6F 69 74 63 75     0156
```

```
20 6F 74 20 79 64 61 65 72 20 74 6F  0162
2E 64 65 74 75 63 65 78 65 20 65 62  016E
                        2F 21        017A
                           31        014A
                                     017C   184 ;-----------------------------------------------------------------------
                                     017C   185 T_EXECUTE:
72 74 73 6E 69 20 74 73 65 54 20 00' 017C   186         .ASCIC  " Test instruction execution error.!/"
75 63 65 78 65 20 6E 6F 69 74 63 75  0188
21 2E 72 6F 72 72 65 20 6E 6F 69 74  0194
                           2F        01A0
                           24        017C
                                     01A1   187 ;-----------------------------------------------------------------------
                                     01A1   188 T_TIMER:
64 65 74 63 65 70 78 65 6E 55 20 00' 01A1   189         .ASCIC  " Unexpected interval timer interrupt.!/"
69 74 20 6C 61 76 72 65 74 6E 69 20  01AD
70 75 72 72 65 74 6E 69 20 72 65 6D  01B9
                     2F 21 2E 74     01C5
                           27        01A1
                                     01C9   190 ;-----------------------------------------------------------------------
                                     01C9   191 T_XFC:
64 65 74 63 65 70 78 65 6E 55 20 00' 01C9   192         .ASCIC  " Unexpected XFC exception.!/"
69 74 70 65 63 78 65 20 43 46 58 20  01D5
                  2F 21 2E 6E 6F     01E1
                           1C        01C9
                                     01E6   193 ;-----------------------------------------------------------------------
                                     01E6   194 T_KSP_ERR1:
20 50 53 20 6C 65 6E 72 65 4B 20 00' 01E6   195         .ASCIC  " Kernel SP is incorrect - EXP = !XL  ACT = !XL!/"
74 63 65 72 72 6F 63 6E 69 20 73 69  01F2
4C 58 21 20 3D 20 50 58 45 20 2D 20  01FE
21 4C 58 21 20 3D 20 54 43 41 20 20  020A
                           2F        0216
                           30        01E6
                                     0217   196 ;-----------------------------------------------------------------------
                                     0217   197 T_KSP_ERR2:
20 50 53 20 6C 65 6E 72 65 4B 20 00' 0217   198         .ASCIC  " Kernel SP - EXP =(UNPREDICTABLE) ACT = !XL!/"
52 50 4E 55 28 3D 20 50 58 45 20 2D  0223
41 20 29 45 4C 42 41 54 43 49 44 45  022F
      2F 21 4C 58 21 20 3D 20 54 43  023B
                           2D        0217
                                     0245   199 ;-----------------------------------------------------------------------
                                     0245   200 T_ISP_ERR1:
20 74 70 75 72 72 65 74 6E 49 20 00' 0245   201         .ASCIC  " Interrupt SP is incorrect - EXP = !XL  ACT = !XL!/"
72 72 6F 63 6E 69 20 73 69 20 50 53  0251
20 3D 20 50 58 45 20 2D 20 74 63 65  025D
21 20 3D 20 54 43 41 20 20 4C 58 21  0269
                     2F 21 4C 58     0275
                           33        0245
                                     0279   202 ;-----------------------------------------------------------------------
                                     0279   203 T_ISP_ERR2:
20 74 70 75 72 72 65 74 6E 49 20 00' 0279   204         .ASCIC  " Interrupt SP - EXP =(UNPREDICTABLE) ACT = !XL!/"
55 28 3D 20 50 58 45 20 2D 20 50 53  0285
45 4C 42 41 54 43 49 44 45 52 50 4E  0291
21 4C 58 21 20 3D 20 54 43 41 20 29  029D
                           2F        02A9
                           30        0279
```

```
                                        02AA   205 ;-----------------------------------------------------------------------
                                        02AA   206 T_SP_ERR1:
6F 63 6E 69 20 73 69 20 50 53 20 00'    02AA   207         .ASCIC  " SP is incorrect - EXP = !XL  ACT = !XL!/"
20 50 58 45 20 2D 20 74 63 65 72 72     02B6
3D 20 54 43 41 20 20 4C 58 21 20 3D     02C2
                  2F 21 4C 58 21 20     02CE
                                  29    02AA
                                        02D4   208 ;-----------------------------------------------------------------------
                                        02D4   209 T_SP_ERR2:
2F 21 4C 58 21 20 3D 20 50 53 20 00'    02D4   210         .ASCIC  " SP = !XL!/"
                                  0B    02D4
                                        02E0   211 ;-----------------------------------------------------------------------
                                        02E0   212 T_GPR_ERR:
69 20 61 74 61 64 20 64 61 42 20 00'    02E0   213         .ASCIC  " Bad data in general purpose register:!/"
75 70 20 6C 61 72 65 6E 65 67 20 6E     02EC
74 73 69 67 65 72 20 65 73 6F 70 72     02F8
                  2F 21 3A 72 65 67     0304
                                  28    02E0
                                        0309   214 ;-----------------------------------------------------------------------
                                        0309   215 T_BAD_DATA:
58 21 20 3D 20 50 58 45 20 20 20 00'    0309   216         .ASCIC  "   EXP = !XL    ACT = !XL    XOR= !XL !/"
21 20 3D 20 54 43 41 20 20 20 20 4C     0315
21 20 3D 52 4F 58 20 20 20 20 4C 58     0321
                  2F 21 20 4C 58 20     032D
                                  28    0309
                                        0332   217 ;-----------------------------------------------------------------------
                                        0332   218 T_GOOD_DATA:
58 21 20 3D 20 50 58 45 20 20 20 00'    0332   219         .ASCIC  "   EXP = !XL    ACT = !XL !/"
21 20 3D 20 54 43 41 20 20 20 20 4C     033E
                  2F 21 20 4C 58 20     034A
                                  1C    0332
                                        034F   220 ;-----------------------------------------------------------------------
                                        034F   221 T_NOT_ON_KS:
72 65 4B 20 6E 6F 20 74 6F 4E 20 00'    034F   222         .ASCIC  " Not on Kernel Stack as expected.!/"
73 61 20 6B 63 61 74 53 20 6C 65 6E     035B
2F 21 2E 64 65 74 63 65 70 78 65 20     0367
                                  23    034F
                                        0373   223 ;-----------------------------------------------------------------------
                                        0373   224 T_NOT_ON_IS:
74 6E 49 20 6E 6F 20 74 6F 4E 20 00'    0373   225         .ASCIC  " Not on Interrupt Stack as expected.!/"
6B 63 61 74 53 20 74 70 75 72 72 65     037F
64 65 74 63 65 70 78 65 20 73 61 20     038B
                        2F 21 2E        0397
                                  26    0373
                                        039A   226 ;-----------------------------------------------------------------------
                                        039A   227 T_EXP_PSL:
50 20 64 65 74 63 65 70 78 45 20 00'    039A   228         .ASCIC  " Expected PSL = !_!XL(X) ; !AC!/"
58 28 4C 58 21 5F 21 20 3D 20 4C 53     03A6
         2F 21 43 41 21 20 3B 20 29     03B2
                                  20    039A
                                        03BB   229 ;-----------------------------------------------------------------------
                                        03BB   230 T_ACT_PSL:
4C 53 50 20 6C 61 75 74 63 41 20 00'    03BB   231         .ASCIC  " Actual PSL = !_!XL(X) ; !AC!/"
20 29 58 28 4C 58 21 5F 21 20 3D 20     03C7
               2F 21 43 41 21 20 3B     03D3
```

```
                                 1E  03BB
                                     03DA    232 ;-----------------------------------------------------------------------------
                                     03DA    233 T_PSL:
58 21 5F 21 20 3D 20 4C 53 50 20 00' 03DA    234         .ASCIC  " PSL = !_!XL (X) ; !AC!/"
21 43 41 21 20 3B 20 29 58 28 20 4C  03E6
                                     03F2
                                     18  03DA
                                     03F3    235 ;-----------------------------------------------------------------------------
                                     03F3    236 T_GPR:
20 20 72 65 74 73 69 67 65 52 20 00' 03F3    237         .ASCIC  " Register  Expected    Actual     XOR!/"
20 20 20 20 64 65 74 63 65 70 78 45  03FF
58 20 20 20 20 20 6C 61 75 74 63 41  040B
                        2F 21 52 4F  0417
                                     27  03F3
                                     041B    238 ;-----------------------------------------------------------------------------
                                     041B    239 T_XOR:
21 20 20 5F 21 43 41 21 20 20 20 00' 041B    240         .ASCIC  "   !AC!_  !XL   !XL   !XL!/"
21 20 20 20 4C 58 21 20 20 20 4C 58  0427
                        2F 21 4C 58  0433
                                     1B  041B
                                     0437    241 ;-----------------------------------------------------------------------------
                                     0437    242 T_NOXOR:
21 20 20 5F 21 43 41 21 20 20 20 00' 0437    243         .ASCIC  "   !AC!_  !XL   !XL!/"
      2F 21 4C 58 21 20 20 20 4C 58  0443
                                     15  0437
                                     044D    244 ;-----------------------------------------------------------------------------
                                     044D    245 T_NO_WCS:
57 20 67 6E 69 74 69 78 45 2F 21 00' 044D    246         .ASCIC  "!/Exiting WCS parity subtest, WCS last address = 0.!/"
75 73 20 79 74 69 72 61 70 20 53 43  0459
6C 20 53 43 57 20 2C 74 73 65 74 62  0465
20 73 73 65 72 64 64 61 20 74 73 61  0471
                  2F 21 2E 30 20 3D  047D
                                     35  044D
                                     0483    247 ;-----------------------------------------------------------------------------
                                     0483    248
                                     0483    249
                                     0483    250
```

```
                    0483    252 .SBTTL  DATA TABLES
                    0483    253
                    0483    254 ; Data table for test 1
                    0483    255
00000000            0483    256 DATA_1:         .LONG   ^X0             ; expected PSL subtest 1
                    0487    257
001D0000            0487    258 DATA_2:         .LONG   ^X1D0000        ; expected PSL subtest 2
                    048B    259
```

```
                    048B   261
                    048B   262 ; This microcode will write R5 into the D register and then decrement the D
                    048B   263 ; register and write it back into R5. Since the second micro word has bad
                    048B   264 ; parity, the operation should be unsucessful and a machine check should
                    048B   265 ; occur when attempting to execute this out of WCS.
                    048B   266
                    048B   267 MICRO_DATA:
                    048B   268                                                  ; first micro word
                    048B   269                                                  ; R[R5]_WB,D_D-1,NEXT/2
00003FC2            048B   270                  .LONG   ^X03FC2
00054047            048F   271                  .LONG   ^X54047
00071203            0493   272                  .LONG   ^X71203
0004840E            0497   273                  .LONG   ^X4840E                ; This has bad parity (good = 8840E)
                    049B   274
                    049B   275                                                  ; second micro word
                    049B   276                                                  ; ROT/ZERO,ALPCTL/WX_S,WCTRL/FLAGS_WB,NEXT -
cont> /2002
00001FC2            049B   277                  .LONG   ^X01FC2
00000307            049F   278                  .LONG   ^X00307
000B7003            04A3   279                  .LONG   ^XB7003
00088005            04A7   280                  .LONG   ^X88005
                    04AB   281
                    04AB   282                                                  ; third micro word
                    04AB   283                                                  ; FLUSH XB,NEXT/2003
00001FC3            04AB   284                  .LONG   ^X01FC3
00000487            04AF   285                  .LONG   ^X00487
00092403            04B3   286                  .LONG   ^X92403
000481A5            04B7   287                  .LONG   ^X481A5
                    04BB   288                                                  ; fourth micro word
                    04BB   289                                                  ; D_R[R5],NEXT/2000
00001FC0            04BB   290                  .LONG   ^X01FC0
00054047            04BF   291                  .LONG   ^X54047
000BE603            04C3   292                  .LONG   ^XBE603
000C8005            04C7   293                  .LONG   ^XC8005
                    04CB   294
                    04CB   295
                    04CB   296
0000000E            04CB   297 TABLE3:  .LONG   14                              ; length for printsig
00660088            04CF   298          .LONG   DS$_MCHK                        ; type of exception
00000028            04D3   299          .LONG   ^X28                            ; length of logout stack
00000002            04D7   300          .LONG   ^X2                             ; error code
FFFFFFFC            04DB   301          .LONG   ^XFFFFFFFC                      ; VA register
000000BB'           04DF   302          .LONG   TAG_3+7                         ; PC at time of error
00000000            04E3   303          .LONG   ^X0                             ; MDR
0000000C            04E7   304          .LONG   ^XC                             ; saved mode rergister
00000000            04EB   305          .LONG   ^X0                             ; read lock timeout
00000000            04EF   306          .LONG   ^X0                             ; TB group parity error reg
00000001            04F3   307          .LONG   ^X1                             ; CACHE error register
00000008            04F7   308          .LONG   ^X8                             ; bus error register
00000008            04FB   309          .LONG   ^X8                             ; machine check summary reg
000000B4'           04FF   310          .LONG   TAG_3                           ; interrupt / exception PC
00000000            0503   311          .LONG   ^X0                             ; interrupt / exception PSL
                    0507   312
                    0507   313
0000000E            0507   314 TABLE4:  .LONG   14                              ; length for printsig
00660088            050B   315          .LONG   DS$_MCHK                        ; type of exception
```

```
00000028  050F   316          .LONG   ^X28              ; length of logout stack
00000001  0513   317          .LONG   ^X1               ; error code
00000000  0517   318          .LONG   ^X0               ; VA register
00000291' 051B   319          .LONG   TAG_4+2           ; PC at time of error
00000AFA' 051F   320          .LONG   XFC_SERVICE+2     ; MDR
00000004  0523   321          .LONG   ^X4               ; saved mode rergister
00000000  0527   322          .LONG   ^X0               ; read lock timeout
00000000  052B   323          .LONG   ^X0               ; TB group parity error reg
00000000  052F   324          .LONG   ^X0               ; CACHE error register
00000000  0533   325          .LONG   ^X0               ; bus error register
00000000  0537   326          .LONG   ^X0               ; machine check summary reg
0000028F' 053B   327          .LONG   TAG_4             ; interrupt / exception PC
00000008  053F   328          .LONG   ^X8               ; interrupt / exception PSL
          0543   329
          0543   330
          0543   331
```

```
                                0543    333 .SBTTL ERROR REPORTING ROUTINE
                                0543    334
                                0543    335 ERR_MESSAGE:
                                0543    336         $DS_BGNMESSAGE  REGMASK=<R2,R7> ; Save R2 and R7
                           0084 0543                    .WORD   ^M<R2,R7>                ; ENTRY MASK
      5E   00000084 8F   C2   0545    337         SUBL2   #BUFSIZ+4,SP            ; Reserve room on stack for cvtreg
           52   5E   D0   054C    338         MOVL    SP,R2                   ; Save starting address of buffer
                           054F    339         $DS_PRINTB_S    FORMAT=T_MC_MESS
           FAD9 CF   9F   054F                    PUSHAB  T_MC_MESS
      000100E0 9F   01   FB   0553                CALLS   #$$N, a#DS$PRINTB
                           055A    340         $DS_PRINTB_S    FORMAT=@ERR$_P1(AP)
             14 BC   9F   055A                    PUSHAB  @ERR$_P1(AP)
      000100E0 9F   01   FB   055D                CALLS   #$$N, a#DS$PRINTB
       32 FAB7 CF   0C   E1   0564    341         BBC     #V_MC_ERR,L_FLAGS,1$    ; br = no machine check error
                           056A    342         $DS_PRINTB_S    FORMAT=T_MC_ERR
           FB69 CF   9F   056A                    PUSHAB  T_MC_ERR
      000100E0 9F   01   FB   056E                CALLS   #$$N, a#DS$PRINTB
   57  38   00000000'EF   C1   0575    343         ADDL3   A_MCHK_BUFFER,#56,R7    ; load address of actual data
        67   FF4A CF   7D   057D    344         MOVQ    TABLE3,(R7)             ; load size and type
                           0582    345         $DS_PRINTSIG_G  ARGPTR=(R7)
      00010100 9F   67   FA   0582                CALLG   (R7), a#DS$PRINTSIG
                           0589    346         $DS_PRINTB_S    FORMAT=T_EXPECTED
           FB7B CF   9F   0589                    PUSHAB  T_EXPECTED
      000100E0 9F   01   FB   058D                CALLS   #$$N, a#DS$PRINTB
                           0594    347         $DS_PRINTSIG_G  ARGPTR=@ERR$_P2(AP)
    00010100 9F   18 BC   FA   0594                CALLG   @ERR$_P2(AP), a#DS$PRINTSIG
       0B FA7F CF   00   E0   059C    348 1$:     BBS     #V_READY,L_FLAGS,3$     ; br = instruction ready to execute
                           05A2    349         $DS_PRINTB_S    FORMAT=T_NOT_READY
           FBA4 CF   9F   05A2                    PUSHAB  T_NOT_READY
      000100E0 9F   01   FB   05A6                CALLS   #$$N, a#DS$PRINTB
       0B FA6E CF   02   E1   05AD    350 3$:     BBC     #V_EXECUTE_ERR,L_FLAGS,4$ ; br = instruction executed
                           05B3    351         $DS_PRINTB_S    FORMAT=T_EXECUTE
           FBC5 CF   9F   05B3                    PUSHAB  T_EXECUTE
      000100E0 9F   01   FB   05B7                CALLS   #$$N, a#DS$PRINTB
       1F FA5D CF   0B   E1   05BE    352 4$:     BBC     #V_ISTK,L_FLAGS,5$      ; br = on kernel stack
       2A FA57 CF   08   E1   05C4    353         BBC     #V_KSP_ERR,L_FLAGS,6$   ; br = no KSP error
                           05CA    354         $DS_PRINTB_S    FORMAT=T_KSP_ERR1,P0=L_EXP_KSP,P1=L_ACT_KSP
            00000000'EF   DD   05CA                PUSHL   L_ACT_KSP
            00000000'EF   DD   05D0                PUSHL   L_EXP_KSP
           FC0C CF   9F   05D6                    PUSHAB  T_KSP_ERR1
      000100E0 9F   03   FB   05DA                CALLS   #$$N, a#DS$PRINTB
                11   11   05E1    355         BRB     6$
                           05E3    356 5$:     $DS_PRINTX_S    FORMAT=T_KSP_ERR2,P0=L_ACT_KSP
            00000000'EF   DD   05E3                PUSHL   L_ACT_KSP
           FC2A CF   9F   05E9                    PUSHAB  T_KSP_ERR2
      000100E8 9F   02   FB   05ED                CALLS   #$$N, a#DS$PRINTX
       1F FA27 CF   0B   E0   05F4    357 6$:     BBS     #V_ISTK,L_FLAGS,7$      ; br = on interrupt stack
       2A FA21 CF   09   E1   05FA    358         BBC     #V_ISP_ERR,L_FLAGS,8$   ; br = no ISP error
                           0600    359         $DS_PRINTB_S    FORMAT=T_ISP_ERR1,P0=L_EXP_ISP,P1=L_ACT_ISP
            00000000'EF   DD   0600                PUSHL   L_ACT_ISP
            00000000'EF   DD   0606                PUSHL   L_EXP_ISP
           FC35 CF   9F   060C                    PUSHAB  T_ISP_ERR1
      000100E0 9F   03   FB   0610                CALLS   #$$N, a#DS$PRINTB
                11   11   0617    360         BRB     8$                      ; skip extened error report
                           0619    361 7$:     $DS_PRINTX_S    FORMAT=T_ISP_ERR2,P0=L_ACT_ISP
```

```
                00000000'EF   DD  0619                          PUSHL   L_ACT_ISP
                    FC56 CF   9F  061F                          PUSHAB  T_ISP_ERR2
            000100E8 9F   02   FB  0623                          CALLS   #$$N, a#DS$PRINTX
             19 F9F1 CF   0A   E1  062A   362 8$:       BBC     #V_SP_ERR,L_FLAGS,9$    ; br = no SP error
                              0630   363             $DS_PRINTB_S    FORMAT=T_SP_ERR1,P0=L_EXP_SP,P1=L_ACT_SP
                00000000'EF   DD  0630                          PUSHL   L_ACT_SP
                00000000'EF   DD  0636                          PUSHL   L_EXP_SP
                    FC6A CF   9F  063C                          PUSHAB  T_SP_ERR1
            000100E0 9F   03   FB  0640                          CALLS   #$$N, a#DS$PRINTB
                         11   11  0647   364             BRB     10$                     ; skip extended error report
                              0649   365 9$:       $DS_PRINTX_S    FORMAT=T_SP_ERR2,P0=L_ACT_SP
                00000000'EF   DD  0649                          PUSHL   L_ACT_SP
                    FC81 CF   9F  064F                          PUSHAB  T_SP_ERR2
            000100E8 9F   02   FB  0653                          CALLS   #$$N, a#DS$PRINTX
             03 F9C1 CF   05   E0  065A   366 10$:      BBS     #V_PSL_ERR,L_FLAGS,11$  ; br = PSL error
                         008A  31  0660   367             BRW     12$                     ; skip messages
                              0663   368 11$:      $DS_CVTREG_S    MSB=#31,DATA=L_EXP_PSL,MNEADR=A_PSLMNE,-
                              0663   369                             STRBUF=(R2),MAXLEN=#BUFSIZ,-
                              0663   370                             V1=MODELIST,V2=MODELIST
                         00   DD  0663                          PUSHL   #0
                         00   DD  0665                          PUSHL   #0
                         00   DD  0667                          PUSHL   #0
                         00   DD  0669                          PUSHL   #0
                00000000'EF   DF  066B                          PUSHAL  MODELIST
                00000000'EF   DF  0671                          PUSHAL  MODELIST
                00000080 8F   DD  0677                          PUSHL   #BUFSIZ
                         62   9F  067D                          PUSHAB  (R2)
                00000000'EF   9F  067F                          PUSHAB  A_PSLMNE
                00000000'EF   DD  0685                          PUSHL   L_EXP_PSL
                         1F   DD  068B                          PUSHL   #31
            000100B0 9F   0B   FB  068D                          CALLS   #11, a#DS$CVTREG
                              0694   371             $DS_PRINTB_S    FORMAT=T_EXP_PSL,P0=L_EXP_PSL,P1=R2
                         52   DD  0694                          PUSHL   R2
                00000000'EF   DD  0696                          PUSHL   L_EXP_PSL
                    FCFA CF   9F  069C                          PUSHAB  T_EXP_PSL
            000100E0 9F   03   FB  06A0                          CALLS   #$$N, a#DS$PRINTB
                              06A7   372             $DS_CVTREG_S    MSB=#31,DATA=L_ACT_PSL,MNEADR=A_PSLMNE,-
                              06A7   373                             STRBUF=(R2),MAXLEN=#BUFSIZ,-
                              06A7   374                             V1=MODELIST,V2=MODELIST
                         00   DD  06A7                          PUSHL   #0
                         00   DD  06A9                          PUSHL   #0
                         00   DD  06AB                          PUSHL   #0
                         00   DD  06AD                          PUSHL   #0
                00000000'EF   DF  06AF                          PUSHAL  MODELIST
                00000000'EF   DF  06B5                          PUSHAL  MODELIST
                00000080 8F   DD  06BB                          PUSHL   #BUFSIZ
                         62   9F  06C1                          PUSHAB  (R2)
                00000000'EF   9F  06C3                          PUSHAB  A_PSLMNE
                00000000'EF   DD  06C9                          PUSHL   L_ACT_PSL
                         1F   DD  06CF                          PUSHL   #31
            000100B0 9F   0B   FB  06D1                          CALLS   #11, a#DS$CVTREG
                              06D8   375             $DS_PRINTB_S    FORMAT=T_ACT_PSL,P0=L_ACT_PSL,P1=R2
                         52   DD  06D8                          PUSHL   R2
                00000000'EF   DD  06DA                          PUSHL   L_ACT_PSL
                    FCD7 CF   9F  06E0                          PUSHAB  T_ACT_PSL
```

```
000100E0 9F    03   FB  06E4                          CALLS   #$$N, a#DS$PRINTB
                44   11  06EB   376          BRB     13$
                         06ED   377 12$:     $DS_CVTREG_S    MSB=#31,DATA=L_EXP_PSL,MNEADR=A_PSLMNE,-
                         06ED   378                          STRBUF=(R2),MAXLEN=#BUFSIZ,-
                         06ED   379                          V1=MODELIST,V2=MODELIST
                00   DD  06ED                          PUSHL   #0
                00   DD  06EF                          PUSHL   #0
                00   DD  06F1                          PUSHL   #0
                00   DD  06F3                          PUSHL   #0
      00000000'EF    DF  06F5                          PUSHAL  MODELIST
      00000000'EF    DF  06FB                          PUSHAL  MODELIST
      00000080 8F    DD  0701                          PUSHL   #BUFSIZ
                62   9F  0707                          PUSHAB  (R2)
      00000000'EF    9F  0709                          PUSHAB  A_PSLMNE
      00000000'EF    DD  070F                          PUSHL   L_EXP_PSL
                1F   DD  0715                          PUSHL   #31
000100B0 9F    0B   FB  0717                          CALLS   #11, a#DS$CVTREG
                         071E   380          $DS_PRINTX_S    FORMAT=T_PSL,P0=L_EXP_PSL,P1=R2
                52   DD  071E                          PUSHL   R2
      00000000'EF    DD  0720                          PUSHL   L_EXP_PSL
          FCB0 CF    9F  0726                          PUSHAB  T_PSL
000100E8 9F    03   FB  072A                          CALLS   #$$N, a#DS$PRINTX
 5C F8EA CF    06   E1  0731   381 13$:     BBC     #V_GPR_ERR,L_FLAGS,17$ ; br = no GPR error
                         0737   382          $DS_PRINTB_S    FORMAT=T_GPR
          FCB8 CF    9F  0737                          PUSHAB  T_GPR
000100E0 9F    01   FB  073B                          CALLS   #$$N, a#DS$PRINTB
53    00000000'EF    DE  0742   383          MOVAL   GPR_TABLE,R3            ; load address of expected data
54    00000000'EF    D0  0749   384          MOVL    A_MCHK_BUFFER,R4        ; load address of actual data
                56   7C  0750   385          CLRQ    R6                      ; init R5 and R6 for counter and data
          57    0D   D0  0752   386          MOVL    #13,R7                  ; load limit
58    00000000'EF45    DE  0755   387 14$:     MOVAL   REG_TABLE[R5],R8        ; load address of ascic string
56    6445    6345   CD  075D   388          XORL3   (R3)[R5],(R4)[R5],R6    ; get XOR of data if bad
                17   13  0763   389          BEQL    15$                     ; br = good data
                         0765   390          $DS_PRINTB_S    FORMAT=T_XOR,P0=R8,P1=(R3)[R5],P2=(R4)[R5],P3=R6
                56   DD  0765                          PUSHL   R6
              6445   DD  0767                          PUSHL   (R4)[R5]
              6345   DD  076A                          PUSHL   (R3)[R5]
                58   DD  076D                          PUSHL   R8
          FCA8 CF    9F  076F                          PUSHAB  T_XOR
000100E0 9F    05   FB  0773                          CALLS   #$$N, a#DS$PRINTB
                13   11  077A   391          BRB     16$                     ; check if finished
                         077C   392 15$:     $DS_PRINTX_S    FORMAT=T_NOXOR,P0=R8,P1=(R3)[R5],P2=(R4)[R5]
              6445   DD  077C                          PUSHL   (R4)[R5]
              6345   DD  077F                          PUSHL   (R3)[R5]
                58   DD  0782                          PUSHL   R8
          FCAF CF    9F  0784                          PUSHAB  T_NOXOR
000100E8 9F    04   FB  0788                          CALLS   #$$N, a#DS$PRINTX
      C2 55    57   F3  078F   393 16$:     AOBLEQ  R7,R5,14$
 0B F888 CF    03   E1  0793   394 17$:     BBC     #V_TIMER,L_FLAGS,18$    ; br = no timer error
                         0799   395          $DS_PRINTB_S    FORMAT=T_TIMER
          FA04 CF    9F  0799                          PUSHAB  T_TIMER
000100E0 9F    01   FB  079D                          CALLS   #$$N, a#DS$PRINTB
 0B F877 CF    0F   E1  07A4   396 18$:     BBC     #V_XFC_ERR,L_FLAGS,19$  ; br = no timer error
                         07AA   397          $DS_PRINTB_S    FORMAT=T_XFC
          FA1B CF    9F  07AA                          PUSHAB  T_XFC
```

```
000100E0 9F    01    FB  07AE                          CALLS   #$$N, @#DS$PRINTB
                         07B5   398 19$:
                         07B5   399          $DS_ENDMESSAGE
                    04   07B5                          RET                     ; RETURN TO DIAGNOSTIC SUPERVISOR
                         07B6   400
                         07B6   401
                         07B6   402 ERR2_MESSAGE:
                         07B6   403          $DS_BGNMESSAGE  REGMASK=<R2,R7> ; Save R2 and R7
                  0084   07B6                          .WORD   ^M<R2,R7>               ; ENTRY MASK
                         07B8   404          $DS_PRINTB_S    FORMAT=T_MC_MESS
          F870 CF    9F   07B8                          PUSHAB  T_MC_MESS
000100E0 9F    01    FB  07BC                          CALLS   #$$N, @#DS$PRINTB
                         07C3   405          $DS_PRINTB_S    FORMAT=@ERR$_P1(AP)
            14 BC    9F   07C3                          PUSHAB  @ERR$_P1(AP)
000100E0 9F    01    FB  07C6                          CALLS   #$$N, @#DS$PRINTB
                         07CD   406          $DS_PRINTB_S    FORMAT=T_MC_ERR
          F906 CF    9F   07CD                          PUSHAB  T_MC_ERR
000100E0 9F    01    FB  07D1                          CALLS   #$$N, @#DS$PRINTB
57   00000000'EF    D0   07D8   407          MOVL    A_MCHK_BUFFER,R7        ; load address of actual data
    67   FCE8 CF    7D   07DF   408          MOVQ    TABLE3,(R7)             ; load size and type
                         07E4   409          $DS_PRINTSIG_G  ARGPTR=(R7)
00010100 9F    67    FA  07E4                          CALLG   (R7), @#DS$PRINTSIG
                         07EB   410          $DS_PRINTB_S    FORMAT=T_EXPECTED
          F919 CF    9F   07EB                          PUSHAB  T_EXPECTED
000100E0 9F    01    FB  07EF                          CALLS   #$$N, @#DS$PRINTB
                         07F6   411          $DS_PRINTSIG_G  ARGPTR=@ERR$_P2(AP)
00010100 9F    18 BC  FA  07F6                          CALLG   @ERR$_P2(AP), @#DS$PRINTSIG
    0B F81D CF    00    E0  07FE   412 1$:      BBS     #V_READY,L_FLAGS,3$     ; br = instruction ready to execute
                         0804   413          $DS_PRINTB_S    FORMAT=T_NOT_READY
          F942 CF    9F   0804                          PUSHAB  T_NOT_READY
000100E0 9F    01    FB  0808                          CALLS   #$$N, @#DS$PRINTB
    0B F80C CF    03    E1  080F   414 3$:      BBC     #V_TIMER,L_FLAGS,4$     ; br = no timer error
                         0815   415          $DS_PRINTB_S    FORMAT=T_TIMER
          F988 CF    9F   0815                          PUSHAB  T_TIMER
000100E0 9F    01    FB  0819                          CALLS   #$$N, @#DS$PRINTB
    0B F7FB CF    0F    E1  0820   416 4$:      BBC     #V_XFC_ERR,L_FLAGS,5$   ; br = no timer error
                         0826   417          $DS_PRINTB_S    FORMAT=T_XFC
          F99F CF    9F   0826                          PUSHAB  T_XFC
000100E0 9F    01    FB  082A                          CALLS   #$$N, @#DS$PRINTB
                         0831   418 5$:
                         0831   419          $DS_ENDMESSAGE
                    04   0831                          RET                     ; RETURN TO DIAGNOSTIC SUPERVISOR
                         0832   420
                         0832   421
                         0832   422
```

```
                        0832   424 .SBTTL  SUBROUTINES
                        0832   425
                        0832   426 ; This routine will load R0 thur R11 with data patterns and read the
                        0832   427 ; AP and FP to check after causing a machine check.
                        0832   428
                        0832   429 LOAD_GPR:
5B  00000000'EF   DE    0832   430          MOVAL   GPR_TABLE,R11   ; load address of data table to load GPR's
        50   8B   7D    0839   431          MOVQ    (R11)+,R0       ; move data into R0 and R1
        52   8B   7D    083C   432          MOVQ    (R11)+,R2       ; move data into R2 and R3
        54   8B   7D    083F   433          MOVQ    (R11)+,R4       ; move data into R4 and R5
        56   8B   7D    0842   434          MOVQ    (R11)+,R6       ; move data into R6 and R7
        58   8B   7D    0845   435          MOVQ    (R11)+,R8       ; move data into R8 and R9
        5A   8B   7D    0848   436          MOVQ    (R11)+,R10      ; move data into R10 and R11
00000000'EF   5C   D0   084B   437          MOVL    AP,L_EXP_AP     ; move contents of AP into expected data table
00000000'EF   5D   D0   0852   438          MOVL    FP,L_EXP_FP     ; move contents of FP into expected data table
              05   05   0859   439          RSB                     ; return
                        085A   440
                        085A   441 ; This routine will read general purpose registers R0 to R11 , the AP, FP, SP
                        085A   442 ; KSP, ISP and PSL into a buffer area (A_MCHK_BUFFER) to check data patterns
                        085A   443 ; and data after a machine check exception. It will then retrun to to address
                        085A   444 ; contained in RENTRY_POINT.
                        085A   445
                        085A   446          .ALIGN  LONG
                        085C   447 READ_GPR:
00000000'FF   50   7D   085C   448          MOVQ    R0,@A_MCHK_BUFFER ; move contents of R0 and R1 into buffer
50  00000000'EF   D0   0863   449          MOVL    A_MCHK_BUFFER,R0 ; load R0 with address of buffer
        50   08   C0   086A   450          ADDL2   #8,R0           ; get over first two entries
        80   52   7D   086D   451          MOVQ    R2,(R0)+        ; move contents of R2 and R3 into buffer
        80   54   7D   0870   452          MOVQ    R4,(R0)+        ; move R4 and R5
        80   56   7D   0873   453          MOVQ    R6,(R0)+        ; move R6 and R7
        80   58   7D   0876   454          MOVQ    R8,(R0)+        ; move R8 and R9
        80   5A   7D   0879   455          MOVQ    R10,(R0)+       ; move R10 and R11
        80   5C   D0   087C   456          MOVL    AP,(R0)+        ; move AP
        80   5D   D0   087F   457          MOVL    FP,(R0)+        ; move FP
00000000'EF   5E   D0   0882   458          MOVL    SP,L_ACT_SP     ; move SP
00000000'EF   00000000'8F   DB   0889   459          MFPR    #PR$_KSP,L_ACT_KSP ; move KSP
00000000'EF   00000000'8F   DB   0894   460          MFPR    #PR$_ISP,L_ACT_ISP ; move ISP
        00000000'EF   DC   089F   461          MOVPSL  L_ACT_PSL       ; move PSL
              50   08   C0   08A5   462          ADDL2   #8,R0           ; save room for printsig size and type
              57   D4   08A8   463          CLRL    R7              ; init counter
              80   8E   D0   08AA   464 1$:       MOVL    (SP)+,(R0)+     ; move MC logout into buffer
           F9 57   0C   F3   08AD   465          AOBLEQ  #12,R7,1$       ; br = not finished
           F757   DF   17   08B1   466          JMP     @RENTRY_POINT   ; return to subtest
                        08B5   467
                        08B5   468
                        08B5   469
                        08B5   470 ; This routine is used to service a WCS parity error machine check. The machine
                        08B5   471 ; check logout is read off the stack into A_MCHK_BUFFER and checked after
                        08B5   472 ; returning.
                        08B5   473
                        08B5   474          .ALIGN  LONG
                        08B8   475 READ_MCHK:
50  00000000'EF   D0   08B8   476          MOVL    A_MCHK_BUFFER,R0 ; load R0 with address of buffer
        50   08   C0   08BF   477          ADDL2   #8,R0           ; save room for printsig size and type
              57   D4   08C2   478          CLRL    R7              ; init counter
```

```
                 55   0C   D0  08C4          MOVL    #12,R5              ; set limit
                 80   8E   D0  08C7  1$:     MOVL    (SP)+,(R0)+         ; move MC logout into buffer
              F9 57   55   F3  08CA          AOBLEQ  R5,R7,1$            ; br = not finished
                 5E   08   C2  08CE          SUBL2   #8,SP               ; back up SP to REI
                      6E   D6  08D1          INCL    (SP)                ; update return address
                           02  08D3          REI                         ; return to subtest
                               08D4
                               08D4
                               08D4  ; This routine will read general purpose registers R0 to R11 , the AP, FP, SP
                               08D4  ; KSP, ISP and PSL into a buffer area (A_MCHK_BUFFER) to check data patterns
                               08D4  ; and data after a machine check interrupt.
                               08D4
                               08D4          .ALIGN  LONG
                               08D4  WTBUS_SERVICE:
        00000000'FF   50   7D  08D4          MOVQ    R0,aA_MCHK_BUFFER ; move contents of R0 and R1 into buffer
        50   00000000'EF   D0  08DB          MOVL    A_MCHK_BUFFER,R0 ; load R0 with address of buffer
                 50   08   C0  08E2          ADDL2   #8,R0               ; get over first two entries
                 80   52   7D  08E5          MOVQ    R2,(R0)+            ; move contents of R2 and R3 into buffer
                 80   54   7D  08E8          MOVQ    R4,(R0)+            ; move R4 and R5
                 80   56   7D  08EB          MOVQ    R6,(R0)+            ; move R6 and R7
                 80   58   7D  08EE          MOVQ    R8,(R0)+            ; move R8 and R9
                 80   5A   7D  08F1          MOVQ    R10,(R0)+           ; move R10 and R11
                 80   5C   D0  08F4          MOVL    AP,(R0)+            ; move AP
                 80   5D   D0  08F7          MOVL    FP,(R0)+            ; move FP
        00000000'EF   5E   D0  08FA          MOVL    SP,L_ACT_SP         ; move SP
  00000000'EF   00000000'8F   DB  0901          MFPR    #PR$_KSP,L_ACT_KSP ; move KSP
  00000000'EF   00000000'8F   DB  090C          MFPR    #PR$_ISP,L_ACT_ISP ; move ISP
                00000000'EF   DC  0917          MOVPSL  L_ACT_PSL           ; move PSL
     F6FA CF   00004000 8F   C8  091D          BISL2   #M_MCINT,L_FLAGS ; set interrupt flag
                           02  0926  1$:     REI                         ; return
                               0927
                               0927
                               0927  ; This routine is called after execution of an instruction which should cause
                               0927  ; a machine check. The MACHINE CHECK LOGOUT, PSL, SP, KSP, ISP, GENERAL
                               0927  ; PURPOSE REGISTERS and FLAG BYTE are examined for expected information. If
                               0927  ; an error exists, a flag is set to indicate that it should be reported.
                               0927
                               0927
                               0927  ERROR_CHECK:
                      57   D4  0927          CLRL    R7                  ; initialize counter
                 55   0D   D0  0929          MOVL    #13,R5              ; set limit
        53   00000000'EF   D0  092C          MOVL    A_MCHK_BUFFER,R3 ; load address of actual data to check
        54   00000000'EF   DE  0933          MOVAL   GPR_TABLE,R4        ; load address of expected data
                 84   83   D1  093A  1$:     CMPL    (R3)+,(R4)+         ; check data
                      09   13  093D          BEQL    2$                  ; br = data is good
     F6D8 CF   000000C0 8F   C8  093F          BISL2   #M_ERROR_FLAG!M_GPR_ERR,L_FLAGS ; set GPR and error flag
              EE 57   55   F3  0948  2$:     AOBLEQ  R5,R7,1$            ; br = not finished
        24 F6CF CF   0D   E0  094C          BBS     #V_INT,L_FLAGS,5$ ; br = checking an interrupt
                 53   08   C0  0952          ADDL2   #8,R3               ; get over size and type to check machine check
                      57   D4  0955          CLRL    R7                  ; init counter
                 55   0C   D0  0957          MOVL    #12,R5              ; set limit
                 86   83   D1  095A  3$:     CMPL    (R3)+,(R6)+         ; check MC logout data
                      13   13  095D          BEQL    4$                  ; br = data good
                 08   57   D1  095F          CMPL    R7,#8               ; cache data ?
                      0E   13  0962          BEQL    4$                  ; ignore cache condition
```

```
                    02   57   D1   0964   534          CMPL    R7,#2                   ; virtual address register?
                      09   13   0967   535          BEQL    4$                      ; ignore va condition
         F6AE CF    00001080 8F   C8   0969   536          BISL2   #M_ERROR_FLAG!M_MC_ERR,L_FLAGS ; set error flag
                     E4 57   55   F3   0972   537 4$:      AOBLEQ  R5,R7,3$                ; br = not finished
    00000000'EF     00000000'EF   D1   0976   538 5$:      CMPL    L_ACT_SP,L_EXP_SP ; check SP
                      09   13   0981   539          BEQL    6$                      ; br = SP is good
         F694 CF    00000480 8F   C8   0983   540          BISL2   #M_SP_ERR!M_ERROR_FLAG,L_FLAGS ; set SP and error flag
           1F 00000000'EF    1A   E1   098C   541 6$:      BBC     #PSL$V_IS,L_ACT_PSL,7$ ; br = on KS no possible error
         F683 CF    00000800 8F   C8   0994   542          BISL2   #M_ISTK,L_FLAGS ; set interrupt stack flag
    00000000'EF     00000000'EF   D1   099D   543          CMPL    L_ACT_KSP,L_EXP_KSP ; check KSP
                      09   13   09A8   544          BEQL    7$                      ; br = KSP is good
         F66D CF    00000180 8F   C8   09AA   545          BISL2   #M_KSP_ERR!M_ERROR_FLAG,L_FLAGS ; set KSP and error flag
             16 F668 CF    0B   E0   09B3   546 7$:      BBS     #V_ISTK,L_FLAGS,8$ ; br = on IS no possible error
    00000000'EF     00000000'EF   D1   09B9   547          CMPL    L_ACT_ISP,L_EXP_ISP ; check ISP
                      09   13   09C4   548          BEQL    8$                      ; br = ISP is good
         F651 CF    00000280 8F   C8   09C6   549          BISL2   #M_ISP_ERR!M_ERROR_FLAG,L_FLAGS ; set ISP and error flag
    00000000'EF     00000000'EF   D1   09CF   550 8$:      CMPL    L_ACT_PSL,L_EXP_PSL ; check PSL
                      3E   13   09DA   551          BEQL    11$                     ; br = PSL is good
                    C2   18   EF   09DC   552          EXTZV   #PSL$V_CURMOD,#PSL$S_CURMOD,-
         F629 CF    00000000'EF        09DF   553                  L_EXP_PSL,L_EXP_MOD ; extract current mode from expected psl
                      02   18   ED   09E7   554          CMPZV   #PSL$V_CURMOD,#PSL$S_CURMOD,-
         F61E CF    00000000'EF        09EA   555                  L_ACT_PSL,L_EXP_MOD ; check current mode for error
                      18   12   09F2   556          BNEQ    9$                      ; br = wrong mode
                    01   1A   EF   09F4   557          EXTZV   #PSL$V_IS,#1,-
         F615 CF    00000000'EF        09F7   558                  L_EXP_PSL,L_EXP_STACK ; extract stack from expected PSL
                      01   1A   ED   09FF   559          CMPZV   #PSL$V_IS,#1,-
         F60A CF    00000000'EF        0A02   560                  L_ACT_PSL,L_EXP_STACK ; check current stack for error
                      05   13   0A0A   561          BEQL    10$                     ; br = mode is good
               F60F CF    10   C8   0A0C   562 9$:      BISL2   #M_FATAL_ERR,L_FLAGS ; signal fatal error
    F606 CF     000000A0 8F   C8   0A11   563 10$:     BISL2   #M_PSL_ERR!M_ERROR_FLAG,L_FLAGS ; set PSL and error flag
          09 F601 CF    00   E0   0A1A   564 11$:     BBS     #V_READY,L_FLAGS,12$ ; br = no ready error
    F5F7 CF     00000080 8F   C8   0A20   565          BISL2   #M_ERROR_FLAG,L_FLAGS ; set error flag
          09 F5F2 CF    02   E1   0A29   566 12$:     BBC     #V_EXECUTE_ERR,L_FLAGS,13$ ; br = no execute error
    F5E8 CF     00000080 8F   C8   0A2F   567          BISL2   #M_ERROR_FLAG,L_FLAGS ; set error flag
          09 F5E3 CF    03   E1   0A38   568 13$:     BBC     #V_TIMER,L_FLAGS,14$ ; br = no unexpected timer interrupt
    F5D9 CF     00000080 8F   C8   0A3E   569          BISL2   #M_ERROR_FLAG,L_FLAGS ; set error flag
                      05   0A47   570 14$:     RSB                             ; return
                           0A48   571
                           0A48   572
                           0A48   573 ; This routine is used to check errors after causing a machine check from
                           0A48   574 ; a WCS parity error.
                           0A48   575
                           0A48   576 ERROR_CHECK1:
         53     00000000'EF   D0   0A48   577                  MOVL    A_MCHK_BUFFER,R3 ; load address of actual data to check
                    53   08   C0   0A4F   578                  ADDL2   #8,R3           ; get over size and type
                    86   83   D1   0A52   579                  CMPL    (R3)+,(R6)+     ; check for machine check logout
                         10   12   0A55   580                  BNEQU   3$              ; br = not a machine check logout
                    86   83   D1   0A57   581                  CMPL    (R3)+,(R6)+     ; check error summary parameter
                         0B   12   0A5A   582                  BNEQU   3$              ; br = incorrect error summary parameter
                    53   24   C0   0A5C   583                  ADDL2   #36,R3          ; Point to PC of Machine check
                    56   24   C0   0A5F   584                  ADDL2   #36,R6          ; Point to Expected PC of Machine check
                    86   83   D1   0A62   585                  CMPL    (R3)+,(R6)+     ; check MC logout data
                         09   13   0A65   586                  BEQLU   4$              ; br = correct PC
    F5B0 CF     00001080 8F   C8   0A67   587 3$:      BISL2   #M_ERROR_FLAG!M_MC_ERR,L_FLAGS ; set error flag
          09 F5AB CF    00   E0   0A70   588 4$:      BBS     #V_READY,L_FLAGS,5$ ; br = no ready error
```

```
                F5A1 CF   00000080 8F   C8  0A76   589          BISL2   #M_ERROR_FLAG,L_FLAGS ; set error flag
                   09 F59C CF    0F   E1  0A7F   590 5$:       BBC     #V_XFC_ERR,L_FLAGS,6$   ; br = no XFC error
                F592 CF   00000080 8F   C8  0A85   591          BISL2   #M_ERROR_FLAG,L_FLAGS ; set error flag
                   09 F58D CF    03   E1  0A8E   592 6$:       BBC     #V_TIMER,L_FLAGS,7$ ; br = no unexpected timer interrupt
                F583 CF   00000080 8F   C8  0A94   593          BISL2   #M_ERROR_FLAG,L_FLAGS ; set error flag
                                       05  0A9D   594 7$:       RSB                           ; return
                                           0A9E   595
                                           0A9E   596
                                           0A9E   597 ; This routine will service any unexpected interval timer interrupts.
                                           0A9E   598
                                           0A9E   599          .ALIGN  LONG
                                           0AA0   600 TIMER_SERVICE:
                      00'  00   DA  0AA0   601          MTPR    #0,S^#PR$_ICCS          ; Turn off the timer
                   F578 CF   08   C8  0AA3   602          BISL2   #M_TIMER,L_FLAGS        ; set error flag
                                       02  0AA8   603          REI                             ; return
                                           0AA9   604
                                           0AA9   605
                                           0AA9   606 ; This routine will clear the buffer area.
                                           0AA9   607
                                           0AA9   608 CLEAR_BUFFER:
                55   00000000'FF   DE  0AA9   609          MOVAL   @A_MCHK_BUFFER,R5 ; get starting buffer address
                       F54C CF   D4  0AB0   610          CLRL    L_COUNT           ; initialize counter
                                 85   D4  0AB4   611 1$:       CLRL    (R5)+             ; clear a buffer location
             F4 F541 CF   00000080 8F   F3  0AB6   612          AOBLEQ  #128,L_COUNT,1$ ; br = not finished
                                       05  0AC0   613          RSB                     ; return
                                           0AC1   614
                                           0AC1   615
                                           0AC1   616 ; This subroutine will load WCS with executable micro code with bad parity.
                                           0AC1   617
                                           0AC1   618 LOAD_MICRO:
                55   00000000'8F   DB  0AC1   619          MFPR    #PR$_SID,R5     ; get the system id register
             56   55    08   08   EF  0AC8   620          EXTZV   #8,#8,R5,R6     ; extract the revision level
                56   00000000'EF   D1  0ACD   621          CMPL    L_REV_CHECK,R6  ; check the current microcode revision level
                                 04   1B  0AD4   622          BLEQU   1$              ; branch if NOT L0008 module
                       F54E DF   D4  0AD6   623          CLRL    @A_WCS_ENA_ADDR         ; Enable writing of WCS
                                 5A   D4  0ADA   624 1$:       CLRL    R10             ; initialize a counter
                   53   F544 CF   D0  0ADC   625          MOVL    A_WCS_ADDRESS,R3        ; load WCS starting address
                   54   F9A6 CF   DE  0AE1   626          MOVAL   MICRO_DATA,R4           ; load address of micro code to be loaded
                        83   84   D0  0AE6   627 10$:      MOVL    (R4)+,(R3)+             ; load 20 bits of micro word
                     F9 5A   10   F2  0AE9   628          AOBLSS  #16,R10,10$             ; br = until all words done
          F52E DF   00100000 8F   C8  0AED   629          BISL2   #M_BIT20,@A_WCS_ADDRESS ; enable WCS
                                       05  0AF6   630          RSB                             ; return
                                           0AF7   631
                                           0AF7   632
                                           0AF7   633 ; This routine is used to service unxepected XFC exceptions.
                                           0AF7   634
                                           0AF7   635 .ALIGN  LONG
                                           0AF8   636
                                           0AF8   637 XFC_SERVICE:
          F51F CF   00008000 8F   C8  0AF8   638          BISL2   #M_XFC_ERR,L_FLAGS ; set error flag
                                 6E   D6  0B01   639          INCL    (SP)                    ; update return address
                                       02  0B03   640          REI                             ; return
                                           0B04   641
                                           0B04   642
                                           0B04   643          $DS_PAGE
```

```
                        0B04                    .SBTTL  TEST 8:  Machine Check Exceptions and Interrupts
                    00000000                    .PSECT  TEST_008, PAGE, NOWRT
                        002C
                        002C    646 ;++
                        002C    647 ; Test description:
                        002C    648 ;
                        002C    649 ;       This test checks some ways a machine chech exception or
                        002C    650 ;       interrupt may occure.
                        002C    651 ;
                        002C    652 ;--
                        002C    653
                        002C    654             $DS_BGNTEST     <MCHK,ALL,DEFAULT>
                        002C        DATA_008:
                00000000    002C                .LONG   0                   ; TEST ARGUMENT TABLE TERMINATOR
                        0030        TEST_008::
                    0000    0030                .WORD   ^M<>                ; ENTRY MASK
                        0032    655             $DS_SETVEC_S    VECTOR=#SCB$L_TIMER, SRVADR=TIMER_SERVICE
                      00    DD  0032                    PUSHL   #0
          00000AA0'EF       DF  0034                    PUSHAL  TIMER_SERVICE
          000000C0 8F       DD  003A                    PUSHL   #SCB$L_TIMER
      00010160 9F   03      FB  0040                    CALLS   #3, @#DS$SETVEC
                        0047    656 1$:
                        0047    657             $DS_PAGE
```

```
                                0047                    .SBTTL  SUBTEST 8.1:  Bus Error ABORT
                                0047    660 ;+
                                0047    661 ; Subtest description:
                                0047    662 ;
                                0047    663 ;       This subtest forces a bus error by attempting to read a nonexistent
                                0047    664 ;       memory location, causing a machine check. The machine check logout
                                0047    665 ;       pushed on the stack is checked for the correct information.
                                0047    666 ;
                                0047    667 ; Subtest steps:
                                0047    668 ;
                                0047    669 ;       SUBTEST BUS ERROR ABORT
                                0047    670 ;       :  Get Machine Check vector to capture exception
                                0047    671 ;       :  IF unsucessful
                                0047    672 ;       :  :  THEN
                                0047    673 ;       :  :  Report system error
                                0047    674 ;       :  :  Abort test
                                0047    675 ;       :  ENDIF
                                0047    676 ;       :  Setup expected data and load GPR's with data
                                0047    677 ;       :  Set ready to execute flag
                                0047    678 ;       :  Access nonexistent memory (to cause exception)
                                0047    679 ;       :  Set execution error flag
                                0047    680 ;       :  IF no exception
                                0047    681 ;       :  :  THEN
                                0047    682 ;       :  :  Set execution error flag
                                0047    683 ;       :  ENDIF
                                0047    684 ;       :  Check machine check logout and register data
                                0047    685 ;       :  IF error is detected
                                0047    686 ;       :  :  THEN
                                0047    687 ;       :  :  Report data error
                                0047    688 ;       :  ENDIF
                                0047    689 ;       :  IF fatal error flag is set
                                0047    690 ;       :  :  THEN
                                0047    691 ;       :  :  Abort test
                                0047    692 ;       :  ENDIF
                                0047    693 ;       :  Release Machine Check vector
                                0047    694 ;       :  IF unsucessful
                                0047    695 ;       :  :  THEN
                                0047    696 ;       :  :  Report system error
                                0047    697 ;       :  :  Abort test
                                0047    698 ;       :  ENDIF
                                0047    699 ;       :  Push return PC and PSL on stack
                                0047    700 ;       :  Execute an REI
                                0047    701 ;       ENDSUBTEST BUS ERROR ABORT
                                0047    702 ;-
                                0047    703
                                0047    704             $DS_BGNSUB
                                0047        T8_S1::
00010030 9F   00000000'EF   FA  0047                        CALLG   $S$, a#DS$BGNSUB
              00000AA9'EF   16  0052    705               JSB     CLEAR_BUFFER                ; clear buffer area
                  26        0F  DA  0058    706           MTPR    #^XF,#PR750$_MCESR          ; clear any previous machine checks 5.2
                            00  DD  005B    707           $DS_SETVEC_S    VECTOR=#SCB$L_MACHCHK, SRVADR=READ_GPR
                                        005B                    PUSHL   #0
                  0000085C'EF   DF  005D                        PUSHAL  READ_GPR
                            04  DD  0063                        PUSHL   #SCB$L_MACHCHK
          00010160 9F       03  FB  0065                        CALLS   #3, a#DS$SETVEC
```

```
                                                    ;
0000000C'EF   000000C2'8F   D0   006C    708 1$:     MOVL    #RENTRY3,RENTRY_POINT   ; load rentry address
              00000020'EF   D4   0077    709         CLRL    L_FLAGS                 ; init flags
              00000000'EF   D4   007D    710         CLRL    L_EXP_SP                ; init expected SP
   00000000'EF   5E   34    C3   0083    711         SUBL3   #52,SP,L_EXP_SP         ; load expected SP
00000000'EF   00000000'8F   DB   008B    712         MFPR    #PR$_ISP,L_EXP_ISP      ; load expected ISP
              00000000'EF   D4   0096    713         CLRL    L_EXP_KSP               ; load expected KSP
00000000'EF   00000483'EF   D0   009C    714         MOVL    DATA_1,L_EXP_PSL        ; load expected PSL
              00000832'EF   16   00A7    715         JSB     LOAD_GPR                ; load GPR's with data
         00000020'EF   01   C8   00AD    716         BISL2   #M_READY,L_FLAGS        ; set ready to execute flag
         55   FFFFFFFC'EF   D0   00B4    717 TAG_3:  MOVL    A_LAST_ADDRESS,R5       ; generate machine check
         00000020'EF   04   C8   00BB    718         BISL2   #M_EXECUTE_ERR,L_FLAGS  ; set execution error flag (should
                                 00C2    719                                         ;  skip over if exception occurs)
                                 00C2    720 RENTRY3:
                                 00C2    721         $DS_CLRVEC_S    VECTOR=#SCB$L_MACHCHK
                          04     DD   00C2                           PUSHL   #SCB$L_MACHCHK
         00010168 9F      01     FB   00C4                           CALLS   #1, a#DS$CLRVEC
                          56     D4   00CB    722 3$:     CLRL    R6                      ; init R6
      56 08   000004CB'8F       C1   00CD    723         ADDL3   #TABLE3,#8,R6           ; load R6 with address of exp data
              00000927'EF   16   00D5    724         JSB     ERROR_CHECK             ; go check logout info for errors
        38 00000020'EF   07   E1   00DB    725         BBC     #V_ERROR_FLAG,L_FLAGS,5$ ; br = no error
                                 00E3    726         $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_BUSERR,P2=#TABLE3
              000004CB'8F   DD   00E3                           PUSHL   #TABLE3
              00000055'8F   DD   00E9                           PUSHL   #T_BUSERR
              00000543'EF   DF   00EF                           PUSHAL  ERR_MESSAGE
                       00   DD   00F5                           PUSHL   #0
                       00   DD   00F7                           PUSHL   #0
                       01   DD   00F9                           PUSHL   #$ER
                            00FB        ;;; TEST 8, SUBTEST 1, ERROR 1
         000100D0 9F   06   FB   00FB                           CALLS   #$$M, a#DS$ERRHARD
                                 0102    727         $DS_BCOMPLETE   4$
                     07 50   E8   0102                           BLBS    R0, 4$
                                 0105    728         $DS_ABORT
         00010020 9F   6C   FA   0105                           CALLG   (AP), a#DS$ABORT
      07 00000020'EF   04   E1   010C    729 4$:     BBC     #V_FATAL_ERR,L_FLAGS,5$ ; br = no fatal errors
                                 0114    730         $DS_ABORT
         00010020 9F   6C   FA   0114                           CALLG   (AP), a#DS$ABORT
                                 011B    731 5$:
                                 011B    732         $DS_ENDSUB
                                 011B        T8_S1_X:
00010038 9F   00000000'EF   FA   011B                           CALLG   $S$, a#DS$ENDSUB
                                 0126    733
                                 0126    734         $DS_PAGE
```

```
                                0126                    .SBTTL  SUBTEST 8.2:  Write Bus Error INTERRUPT
                                0126    737 ;+
                                0126    738 ; Subtest description:
                                0126    739 ;
                                0126    740 ;       This subtest forces a write bus error by writing to a nonexistent
                                0126    741 ;       memory location. An interrupt is generated and the interrupt pc
                                0126    742 ;       is checked.
                                0126    743 ;
                                0126    744 ; Subtest steps:
                                0126    745 ;
                                0126    746 ;       SUBTEST WRITE BUS ERROR INTERRUPT
                                0126    747 ;       :  Get Machine Check vector to capture exception
                                0126    748 ;       :  IF unsucessful
                                0126    749 ;       :  :  THEN
                                0126    750 ;       :  :  Report system error
                                0126    751 ;       :  :  Abort test
                                0126    752 ;       :  ENDIF
                                0126    753 ;       :  Setup expected data and load GPR's with data
                                0126    754 ;       :  Set ready to execute flag
                                0126    755 ;       :  Access nonexistent memory (to cause exception)
                                0126    756 ;       :  Set execution error flag
                                0126    757 ;       :  IF no exception
                                0126    758 ;       :  :  THEN
                                0126    759 ;       :  :  Set execution error flag
                                0126    760 ;       :  ENDIF
                                0126    761 ;       :  Check machine check logout and register data
                                0126    762 ;       :  IF error is detected
                                0126    763 ;       :  :  THEN
                                0126    764 ;       :  :  Report data error
                                0126    765 ;       :  ENDIF
                                0126    766 ;       :  IF fatal error flag is set
                                0126    767 ;       :  :  THEN
                                0126    768 ;       :  :  Abort test
                                0126    769 ;       :  ENDIF
                                0126    770 ;       :  Release Machine Check vector
                                0126    771 ;       :  IF unsucessful
                                0126    772 ;       :  :  THEN
                                0126    773 ;       :  :  Report system error
                                0126    774 ;       :  :  Abort test
                                0126    775 ;       :  ENDIF
                                0126    776 ;       :  Push return PC and PSL on stack
                                0126    777 ;       :  Execute an REI
                                0126    778 ;       ENDSUBTEST WRITE BUS ERROR INTERRUPT
                                0126    779 ;-
                                0126    780
                                0126    781         $DS_BGNSUB
                                0126        T8_S2::
00010030 9F   0000000C'EF   FA  0126                CALLG   $S$, a#DS$BGNSUB
              00000AA9'EF   16  0131    782         JSB     CLEAR_BUFFER            ; clear data buffer
                  26   0F   DA  0137    783         MTPR    #^XF,#PR750$_MCESR      ; clear any previous machine checks 5.2
                               013A    784         $DS_SETVEC_S    VECTOR=#SCB$L_WTBUSERR, SRVADR=WTBUS_SERVICE
                       00   DD  013A                PUSHL   #0
                000008D4'EF   DF  013C                PUSHAL  WTBUS_SERVICE
                00000060 8F   DD  0142                PUSHL   #SCB$L_WTBUSERR
            00010160 9F   03   FB  0148                CALLS   #3, a#DS$SETVEC
```

```
                00000020'EF   D4   014F    785 1$:     CLRL    L_FLAGS                 ; init flags
                00000832'EF   16   0155    786         JSB     LOAD_GPR                ; load GPR's with data
                00000000'EF   D4   015B    787         CLRL    L_EXP_SP                ; init expected SP
     00000000'EF    5E   08   C3   0161    788         SUBL3   #8,SP,L_EXP_SP          ; load expected SP
00000000'EF    00000000'8F   DB   0169    789         MFPR    #PR$_ISP,L_EXP_ISP      ; load expected ISP
                00000000'EF   D4   0174    790         CLRL    L_EXP_KSP               ; clear KSP unpredictable
00000000'EF    00000487'EF   D0   017A    791         MOVL    DATA_2,L_EXP_PSL        ; load expected PSL
0000001C'EF    00002710 8F   D0   0185    792         MOVL    #10000,L_TIMER          ; set timer
          00000020'EF    01   C8   0190    793         BISL2   #M_READY,L_FLAGS        ; set ready to execute flag
FFFFFFFC'EF    00000000'EF   D0   0197    794         MOVL    L_DATA,A_LAST_ADDRESS   ; generate machine check interrupt
       0E 00000020'EF    0E   E0   01A2    795 2$:     BBS     #V_MCINT,L_FLAGS,3$     ; br = interrupt has been serviced
         F1 0000001C'EF   F4   01AA    796         SOBGEQ  L_TIMER,2$              ; br = no time out yet
          00000020'EF    04   C8   01B1    797         BISL2   #M_EXECUTE_ERR,L_FLAGS  ; set execution error flag (should not
                                  01B8    798                                         ;  get here if exception occurs)
                                  01B8    799 3$:     $DS_CLRVEC_S    VECTOR=#SCB$L_WTBUSERR
                00000060 8F   DD   01B8                         PUSHL   #SCB$L_WTBUSERR
          00010168 9F    01   FB   01BE                         CALLS   #1, a#DS$CLRVEC
00000020'EF    00002000 8F   C8   01C5    800 4$:     BISL2   #M_INT,L_FLAGS          ; set interrupt flag
                00000927'EF   16   01D0    801         JSB     ERROR_CHECK             ; go check logout info for errors
       32 00000020'EF    07   E1   01D6    802         BBC     #V_ERROR_FLAG,L_FLAGS,6$ ; br = no error
                                  01DE    803         $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR_MESSAGE,P1=#T_WTBUSERR
                00000080'8F   DD   01DE                         PUSHL   #T_WTBUSERR
                00000543'EF   DF   01E4                         PUSHAL  ERR_MESSAGE
                         00   DD   01EA                         PUSHL   #0
                         00   DD   01EC                         PUSHL   #0
                         01   DD   01EE                         PUSHL   #$ER
                                  01F0        ;;; TEST 8, SUBTEST 2, ERROR 1
          000100D0 9F    05   FB   01F0                         CALLS   #$$M, a#DS$ERRHARD
                                  01F7    804         $DS_BCOMPLETE   5$
                      07 50   E8   01F7                         BLBS    R0, 5$
                                  01FA    805         $DS_ABORT
          00010020 9F    6C   FA   01FA                         CALLG   (AP), a#DS$ABORT
       07 00000020'EF    04   E1   0201    806 5$:     BBC     #V_FATAL_ERR,L_FLAGS,6$ ; br = no fatal errors
                                  0209    807         $DS_ABORT
          00010020 9F    6C   FA   0209                         CALLG   (AP), a#DS$ABORT
                                  0210    808 6$:
                                  0210    809         $DS_ENDSUB
                                  0210        T8_S2_X:
00010038 9F    0000000C'EF   FA   0210                         CALLG   $S$, a#DS$ENDSUB
                                  021B    810         $DS_PAGE
                                  021B    811
```

```
                                021B                    .SBTTL  SUBTEST 8.3:  WCS Parity Error ABORT
                                021B    814 ;+
                                021B    815 ; Subtest description:
                                021B    816 ;
                                021B    817 ;       This subtest checks that WCS loaded with a micro word that has bad
                                021B    818 ;       parity will cause a machine check. First a set of micro words with bad
                                021B    819 ;       parity are written into the WCS. Next execution of the micro word is
                                021B    820 ;       attempted, which should cause a control store parity error machine
                                021B    821 ;       check. The machine check logout is checked to contain the correct
                                021B    822 ;       information.
                                021B    823 ;
                                021B    824 ; Subtest steps:
                                021B    825 ;
                                021B    826 ;       SUBTEST WCS Parity Error ABORT
                                021B    827 ;       :  Initialize flags
                                021B    828 ;       :  Write 3 micro words, one with bad parity
                                021B    829 ;       :  Use XFC instruction to execute out of WCS
                                021B    830 ;       :  Capture the machine check
                                021B    831 ;       :  IF machine check logout is incorrect
                                021B    832 ;       :  :  THEN
                                021B    833 ;       :  :  Report error
                                021B    834 ;       :  ENDIF
                                021B    835 ;       ENDSUBTEST WCS Parity Error ABORT
                                021B    836 ;
                                021B    837 ;
                                021B    838 ;--
                                021B    839
                                021B    840         $DS_BGNSUB
                                021B        T8_S3::
00010030 9F   00000018'EF   FA  021B                CALLG   $S$, a#DS$BGNSUB
                                0226    841
         51   00000000'EF   D0  0226    842        MOVL    KA_PTABLE,R1    ; load address of p table
                    36 A1   B5  022D    843        TSTW    KA$W_WCS(R1)    ; check to see if WCS is there
                       19   12  0230    844        BNEQ    2$              ; br = yes, test WCS
              0000FE54'EF   01  D1  0232    845        CMPL    #1,DSA$GL_PASSNO ; check for first pass
                       0D   12  0239    846        BNEQ    1$              ; br = not first pass
                                023B    847        $DS_PRINTF_S    FORMAT=T_NO_WCS
                00000044D'EF   9F  023B                PUSHAB  T_NO_WCS
         000100F0 9F   01   FB  0241                CALLS   #$$N, a#DS$PRINTF
                                0248    848 1$:     $DS_EXIT        SUB
                     00A5   31  0248                BRW     T8_S3_X ; EXIT SUBTEST 3
                                024B    849
                00000020'EF   D4  024B    850 2$:     CLRL    L_FLAGS         ; initialize flags
                00000AC1'EF   16  0251    851        JSB     LOAD_MICRO      ; load wcs with micro code
                00000AA9'EF   16  0257    852        JSB     CLEAR_BUFFER    ; clear buffer area
                                025D    853        $DS_SETVEC_S    VECTOR=#SCB$L_OPCCUS,SRVADR=XFC_SERVICE,CODE=#2
                       02   DD  025D                PUSHL   #2
                00000AF8'EF   DF  025F                PUSHAL  XFC_SERVICE
                       14   DD  0265                PUSHL   #SCB$L_OPCCUS
         00010160 9F   03   FB  0267                CALLS   #3, a#DS$SETVEC
                    26   0F   DA  026E    854        MTPR    #^XF,#PR750$_MCESR      ; clear any previous machine checks 5.2
                                0271    855        $DS_SETVEC_S    VECTOR=#SCB$L_MACHCHK, SRVADR=READ_MCHK,CODE=#1
                       01   DD  0271                PUSHL   #1
                000008B8'EF   DF  0273                PUSHAL  READ_MCHK
                       04   DD  0279                PUSHL   #SCB$L_MACHCHK
```

```
        00010160 9F   03   FB  027B                          CALLS   #3, a#DS$SETVEC
             00000020'EF   D4  0282   856          CLRL    L_FLAGS                  ; init flags
        00000020'EF   01   C8  0288   857          BISL2   #M_READY,L_FLAGS         ; set ready to execute flag
                           FC  028F   858 TAG_4:   XFC                        ; generate machine check
                           01  0290   859          NOP                        ; skip a location
                           01  0291   860          NOP                        ; skip a location
                           01  0292   861          NOP                        ; skip a location
                           01  0293   862          NOP                        ; skip a location
        57   00000024'EF   D0  0294   863          MOVL    A_WCS_ADDRESS,R7; load address of first WCS location in R7
                      67   D4  029B   864          CLRL    (R7)               ; Clear the first location to insure that
                               029D   865                                     ; WCS is turned off.
                               029D   866          $DS_CLRVEC_S    VECTOR=#SCB$L_MACHCHK
                      04   DD  029D                          PUSHL   #SCB$L_MACHCHK
        00010168 9F   01   FB  029F                          CALLS   #1, a#DS$CLRVEC
                               02A6   867          $DS_CLRVEC_S    VECTOR=#SCB$L_OPCCUS
                      14   DD  02A6                          PUSHL   #SCB$L_OPCCUS
        00010168 9F   01   FB  02A8                          CALLS   #1, a#DS$CLRVEC
                      56   D4  02AF   868          CLRL    R6                       ; init R6
   56   08   00000507'8F   C1  02B1   869          ADDL3   #TABLE4,#8,R6            ; load R6 with address of exp data
             00000A48'EF   16  02B9   870          JSB     ERROR_CHECK1             ; go check logout info for errors
   29 00000020'EF   07   E1  02BF   871          BBC     #V_ERROR_FLAG,L_FLAGS,4$ ; br = no error
                               02C7   872          $DS_ERRHARD_S   UNIT=#0,PRLINK=ERR2_MESSAGE,P1=#T_WCS_ERR,P2=#TABLE4
             00000507'8F   DD  02C7                          PUSHL   #TABLE4
             000000AD'8F   DD  02CD                          PUSHL   #T_WCS_ERR
             000007B6'EF   DF  02D3                          PUSHAL  ERR2_MESSAGE
                      00   DD  02D9                          PUSHL   #0
                      00   DD  02DB                          PUSHL   #0
                      01   DD  02DD                          PUSHL   #$ER
                               02DF       ;;; TEST 8, SUBTEST 3, ERROR 1
        000100D0 9F   06   FB  02DF                          CALLS   #$$M, a#DS$ERRHARD
                               02E6   873          $DS_BCOMPLETE   4$
                   07 50   E8  02E6                          BLBS    R0, 4$
                               02E9   874          $DS_ABORT
        00010020 9F   6C   FA  02E9                          CALLG   (AP), a#DS$ABORT
                               02F0   875 4$:
                               02F0   876
                               02F0   877          $DS_ENDSUB
                               02F0       T8_S3_X:
00010038 9F   00000018'EF   FA  02F0                          CALLG   $S$, a#DS$ENDSUB
                               02FB   878
                               02FB   879          $DS_PAGE
             000000C0 8F   DD  02FB                          PUSHL   #SCB$L_TIMER
        00010168 9F   01   FB  0301                          CALLS   #1, a#DS$CLRVEC
                  50   01   D0  0308                          MOVL    #1, R0           ; NORMAL EXIT
                               030B       TEST_008_X::
        00010058 9F   6E   FA  030B                          CALLG   (SP), a#DS$BREAK
                           04  0312                          RET                      ; RETURN TO TEST SEQUENCER
                           00000000                          .PSECT  $TSTCNT, NOEXE, NOWRT, OVR, LONG
                     00000008  0000                          .LONG   $TN
                               0004   883          .END
```

```
$$$                             = 00000018 R      05
$$ARGS                          = 0000000A
$$E                             = 00000001
$$M                             = 00000006
$$N                             = 00000001
$$S                             = FFFFFFFF
$$T1                            = 0000002C
$ENV                            = 00000001   G
$ER                             = FFFFFFFF
$MO                             = 00000001   G
$S$                             = 00000018 R      05
$ST                             = 00000000
$TN                             = 00000008
ALL                             = 00000009   G
A_LAST_ADDRESS                  = FFFFFFFC
A_MCHK_BUFFER                     ********     X    01
A_PSLMNE                          ********     X    01
A_WCS_ADDRESS                     00000024 R      01
A_WCS_ENA_ADDR                    00000028 R      01
BASE_008                          00000000 R      03
BIT...                          = 0000001A
BUFSIZ                          = 00000080
CEP_FUNCTIONAL                  = 00000000
CEP_REPAIR                      = 00000001
CLEAR_BUFFER                      00000AA9 R      01
DATA_008                          0000002C R      03
DATA_1                            00000483 R      01
DATA_2                            00000487 R      01
DEFAULT                         = 00000000   G
DS$ABORT                          00010020
DS$ASKADR                         00010090
DS$ASKDATA                        00010080
DS$ASKLGCL                        00010098
DS$ASKSTR                         000100A0
DS$ASKVLD                         00010088
DS$ATTACH                         000101A8
DS$BGNSUB                         00010030
DS$BRANCH                         000100A8
DS$BREAK                          00010058
DS$CANWAIT                        00010070
DS$CHANNEL                        00010180
DS$CKLOOP                         00010040
DS$CLRVEC                         00010168
DS$CNTRLC                         00010078
DS$CVTREG                         000100B0
DS$ENDPASS                        00010010
DS$ENDSUB                         00010038
DS$ERRDEV                         000100C8
DS$ERRHARD                        000100D0
DS$ERRPREP                        00010108
DS$ERRSOFT                        000100D8
DS$ERRSYS                         000100C0
DS$ESCAPE                         00010050
DS$FREEDBGSYM                     000101B8
DS$GETBUF                         00010120
DS$GETMEM                         00010130
DS$GETTERM                        000101C8
DS$GPHARD                         00010018
DS$HELP                           000101B0
DS$INITSCB                        00010170
DS$INLOOP                         00010048
DS$K_ERROR                      = 00000002
DS$K_NORMAL                     = 00000001
DS$K_SEVERE                     = 00000004
DS$K_SUBSYS                     = 00000066
DS$K_WARNING                    = 00000000
DS$LOAD                           00010198
DS$LOADPCS                        000101C0
DS$MAPDBGBLOCK                    00010118
DS$MEMSIZE                        000101D8
DS$MMOFF                          00010158
DS$MMON                           00010150
DS$MOVPHY                         00010148
DS$MOVVRT                         00010140
DS$PARSE                          000100B8
DS$PRINTB                         000100E0
DS$PRINTF                         000100F0
DS$PRINTS                         000100F8
DS$PRINTSIG                       00010100
DS$PRINTX                         000100E8
DS$PROBE                          000101A0
DS$RELBUF                         00010128
DS$RELMEM                         00010138
DS$SERVICE_DISPATCHER             000101D0
DS$SETIPL                         00010178
DS$SETMAP                         00010188
DS$SETPRIEXV                      00010110
DS$SETVEC                         00010160
DS$SHOCHAN                        00010190
DS$SUMMARY                        00010028
DS$WAITMS                         00010060
DS$WAITUS                         00010068
DS$_ARITH                       = 006600D0
DS$_ASBE                        = 00660118
DS$_BADLINK                     = 006600F0
DS$_BADTYPE                     = 006600E8
DS$_BIIC                        = 00660120
DS$_CHME                        = 006600A8
DS$_CHMK                        = 006600E0
DS$_DEVNAME                     = 00660108
DS$_ERROR                       = 00660002
DS$_FHWE                        = 00660068
DS$_FRAGBUF                     = 00660080
DS$_ICBUSY                      = 006600C8
DS$_ICERR                       = 006600C0
DS$_IHWE                        = 00660060
DS$_ILLCHAR                     = 00660018
DS$_ILLPAGCNT                   = 00660078
DS$_ILLUNIT                     = 00660100
DS$_INSFMEM                     = 00660050
```

```
DS$_IPL2HI                      = 006600B8
DS$_IVADDR                      = 00660040
DS$_IVVECT                      = 00660038
DS$_KRNLSTK                     = 00660090
DS$_LOGIC                       = 00660070
DS$_MCHK                        = 00660088
DS$_MMOFF                       = 00660058
DS$_NEEDUNIT                    = 006600F8
DS$_NODE                        = 00660128
DS$_NOPCS                       = 00660110
DS$_NORMAL                      = 00660001
DS$_NOSUPPORT                   = 006600B1
DS$_NOTDON                      = 00660030
DS$_NOTIMP                      = 006600B0
DS$_NULLSTR                     = 00660010
DS$_OVERFLOW                    = 00660008
DS$_POWER                       = 00660098
DS$_PROGERR                     = 00660020
DS$_SEVERE                      = 00660004
DS$_TRANSL                      = 006600A0
DS$_TRUNCATE                    = 00660028
DS$_UNEXPINT                    = 006600D8
DS$_VASFULL                     = 00660048
DS$_WARNING                     = 00660000
DSA$AL_APTMAIL                    0000FE00
DSA$AT_APTTXT                     0000FA00
DSA$GL_APTCOM                     0000FE04
DSA$GL_DEVLEN                     0000FE58
DSA$GL_ERRNO                      0000FE44
DSA$GL_EVENT                      0000FE48
DSA$GL_FLAGS                      0000FE00
DSA$GL_MSGTYP                     0000FE40
DSA$GL_PASSES                     0000FE08
DSA$GL_PASSNO                     0000FE54
DSA$GL_SECTNO                     0000FE10
DSA$GL_SID                        0000FE14
DSA$GL_SUBTNO                     0000FE4C
DSA$GL_TESTNO                     0000FE50
DSA$GL_UNITS                      0000FE0C
DSA$GQ_MSGPTR                     0000FE68
DSA$GT_DEVNAM                     0000FE5C
ENV$M_DOMAIN                    = 00000002
ENV$M_LEVEL                     = 00000001
ENV$M_SUPER                     = 000003FC
ENV$S_DOMAIN                    = 00000001
ENV$S_LEVEL                     = 00000001
ENV$S_SUPER                     = 00000008
ENV$V_DOMAIN                    = 00000001
ENV$V_LEVEL                     = 00000000
ENV$V_SUPER                     = 00000002
ENV$_CPU                        = 00000000
ENV$_FUNCTIONAL                 = 00000000
ENV$_REPAIR                     = 00000001
ENV$_SUPER                      = 00000001
ENV$_SYSTEM                     = 00000001

ERR$_MSGADR                     = 0000000C
ERR$_NARGS                      = 0000000A
ERR$_NUM                        = 00000004
ERR$_P1                         = 00000014
ERR$_P2                         = 00000018
ERR$_P3                         = 0000001C
ERR$_P4                         = 00000020
ERR$_P5                         = 00000024
ERR$_P6                         = 00000028
ERR$_POINTER                    = 00000010
ERR$_UNIT                       = 00000008
ERR2_MESSAGE                      000007B6 R      01
ERROR_CHECK                       00000927 R      01
ERROR_CHECK1                      00000A48 R      01
ERR_MESSAGE                       00000543 R      01
GPR_TABLE                         ********    X   01
HALT                            = 00000004    G
HP$A_DEPENDENT                    00000032
HP$A_DEVICE                       00000018
HP$A_DVA                          0000001C
HP$A_LINK                         00000020
HP$B_DRIVE                        0000000B
HP$B_FLAGS                        0000000A
HP$Q_DEVICE                       00000000
HP$T_DEVICE                       0000000C
HP$T_TYPE                         00000026
HP$W_SIZE                         00000008
HP$W_VECTOR                       00000024
IPR                             = 00000006    G
KA$B_ACC_TYPE                     00000042    G
KA$B_NODE_ID                      00000046    G
KA$B_RESERVED                     00000043    G
KA$B_SID_TYPE                     0000003D    G
KA$K_LEN                          0000004B    G
KA$L_FLAGS                        00000032    G
KA$L_MEM_SIZE                     00000047    G
KA$L_SID                          0000003A    G
KA$M_CHAR                       = 00000100    G
KA$M_CRC                        = 00000010    G
KA$M_D_FLOAT                    = 00000002    G
KA$M_EDIT                       = 00000080    G
KA$M_F_FLOAT                    = 00000001    G
KA$M_G_FLOAT                    = 00000004    G
KA$M_H_FLOAT                    = 00000008    G
KA$M_PACKED                     = 00000020    G
KA$M_PACK_MUL                   = 00000040    G
KA$M_SB_ERR                     = 02000000    G
KA$M_TODR                       = 00010000    G
KA$M_WCS_LD                     = 01000000    G
KA$V_CHAR                       = 00000008    G
KA$V_CRC                        = 00000004    G
KA$V_D_FLOAT                    = 00000001    G
KA$V_EDIT                       = 00000007    G
KA$V_F_FLOAT                    = 00000000    G
KA$V_G_FLOAT                    = 00000002    G
```

```
KA$V_H_FLOAT                    = 00000003  G
KA$V_PACKED                     = 00000005  G
KA$V_PACK_MUL                   = 00000006  G
KA$V_SB_ERR                     = 00000019  G
KA$V_TODR                       = 00000010  G
KA$V_WCS_LD                     = 00000018  G
KA$W_LATENCY                      0000003E  G
KA$W_MEM_SIZE                     00000044  G
KA$W_PROGRESS                     00000040  G
KA$W_RESERVED                     00000038  G
KA$W_WCS                          00000036  G
KA_PTABLE                         ********    X   03
LOAD_GPR                          00000832 R      01
LOAD_MICRO                        00000AC1 R      01
L_ACT_ISP                         ********    X   01
L_ACT_KSP                         ********    X   01
L_ACT_PSL                         ********    X   01
L_ACT_SP                          ********    X   01
L_ADDRESS                         00000004 R      01
L_COUNT                           00000000 R      01
L_CUR_ISP                         00000008 R      01
L_DATA                          = 00000000
L_EXP_AP                          ********    X   01
L_EXP_FP                          ********    X   01
L_EXP_ISP                         ********    X   01
L_EXP_KSP                         ********    X   01
L_EXP_MOD                         00000010 R      01
L_EXP_PSL                         ********    X   01
L_EXP_SP                          ********    X   01
L_EXP_STACK                       00000014 R      01
L_FLAGS                           00000020 R      01
L_REV_CHECK                       ********    X   01
L_TIMER                           0000001C R      01
MANUAL                          = 00000001  G
MCHK                            = 00000005  G
MICRO_DATA                        0000048B R      01
MODELIST                          ********    X   01
MSG_008                           00000002 R      03
M_BIT19                         = 00080000
M_BIT20                         = 00100000
M_DONE                          = 00000002
M_ERROR_FLAG                    = 00000080
M_EXECUTE_ERR                   = 00000004
M_FATAL_ERR                     = 00000010
M_GPR_ERR                       = 00000040
M_INT                           = 00002000
M_ISP_ERR                       = 00000200
M_ISTK                          = 00000800
M_KSP_ERR                       = 00000100
M_MCINT                         = 00004000
M_MC_ERR                        = 00001000
M_PSL_ERR                       = 00000020
M_READY                         = 00000001
M_SP_ERR                        = 00000400
M_TIMER                         = 00000008
M_XFC_ERR                       = 00008000
PAR$M_ATDEF                     = 00000010
PAR$M_ATHI                      = 00000008
PAR$M_ATLO                      = 00000004
PAR$M_NODEF                     = 00000002
PAR$V_ATDEF                     = 00000004
PAR$V_ATHI                      = 00000003
PAR$V_ATLO                      = 00000002
PAR$V_NODEF                     = 00000001
PAR$_BIN                        = 00000002
PAR$_DEC                        = 0000000A
PAR$_HEX                        = 00000010
PAR$_NO                         = 00000000
PAR$_OCT                        = 00000008
PAR$_YES                        = 00000001
PCS                             = 00000008  G
POWER_FAIL                      = 00000003  G
PR$_ICCS                          ********    X   01
PR$_ISP                           ********    X   01
PR$_KSP                           ********    X   01
PR$_SID                           ********    X   01
PR750$_MCESR                    = 00000026
PSL$K_EXEC                      = 00000001
PSL$K_KERNEL                    = 00000000
PSL$K_SUPER                     = 00000002
PSL$K_USER                      = 00000003
PSL$M_CBIT                      = 00000001
PSL$M_NBIT                      = 00000008
PSL$M_VBIT                      = 00000002
PSL$M_ZBIT                      = 00000004
PSL$S_CURMOD                    = 00000002
PSL$V_CBIT                      = 00000000
PSL$V_CURMOD                    = 00000018
PSL$V_IS                        = 0000001A
PSL$V_NBIT                      = 00000003
PSL$V_VBIT                      = 00000001
PSL$V_ZBIT                      = 00000002
READ_GPR                          0000085C R      01
READ_MCHK                         00000BB8 R      01
REG_TABLE                         ********    X   01
RENTRY3                           000000C2 R      03
RENTRY_POINT                      0000000C R      01
SCB$L_ACCESS                      00000020
SCB$L_ARITH                       00000034
SCB$L_BREAK                       0000002C
SCB$L_CHME                        00000044
SCB$L_CHMK                        00000040
SCB$L_CHMS                        00000048
SCB$L_CHMU                        0000004C
SCB$L_COMPAT                      00000030
SCB$L_KNLSTK                      00000008
SCB$L_MACHCHK                     00000004
SCB$L_OPCCUS                      00000014
SCB$L_OPCDEC                      00000010
SCB$L_POWER                       0000000C
```

```
SCB$L_RADRMOD                 0000001C    SYS$SETPRT                    00010430
SCB$L_ROPRAND                 00000018    SYS$SETRWM                    00010438
SCB$L_RXDB                    000000F8    SYS$SETSWM                    00010448
SCB$L_SFTLVL1                 00000084    SYS$ULKPAG                    00010460
SCB$L_SFTLVL10                000000A8    SYS$ULWSET                    00010468
SCB$L_SFTLVL11                000000AC    SYS$UNWIND                    00010470
SCB$L_SFTLVL12                000000B0    SYS$WAITFR                    00010478
SCB$L_SFTLVL13                000000B4    SYS$WFLAND                    00010488
SCB$L_SFTLVL14                000000B8    SYS$WFLOR                     00010490
SCB$L_SFTLVL15                000000BC    T8_S1                         00000047 RG     03
SCB$L_SFTLVL2                 00000088    T8_S1_X                       0000011B R      03
SCB$L_SFTLVL3                 0000008C    T8_S2                         00000126 RG     03
SCB$L_SFTLVL4                 00000090    T8_S2_X                       00000210 R      03
SCB$L_SFTLVL5                 00000094    T8_S3                         0000021B RG     03
SCB$L_SFTLVL6                 00000098    T8_S3_X                       000002F0 R      03
SCB$L_SFTLVL7                 0000009C    TABLE3                        000004CB R      01
SCB$L_SFTLVL8                 000000A0    TABLE4                        00000507 R      01
SCB$L_SFTLVL9                 000000A4    TAG_3                         000000B4 R      03
SCB$L_TBIT                    00000028    TAG_4                         0000028F R      03
SCB$L_TIMER                   000000C0    TEST_008                      00000030 RG     03
SCB$L_TRANSL                  00000024    TEST_008_X                    0000030B RG     03
SCB$L_TXDB                    000000FC    TIMER_SERVICE                 00000AA0 R      01
SCB$L_WTBUSERR              = 00000060    TU58                        = 00000002   G
SCB$L_ZERO                    00000000    T_ACT_PSL                     000003BB R      01
SEP_FUNCTIONAL              = 00000002    T_BAD_DATA                    00000309 R      01
SEP_REPAIR                  = 00000003    T_BUSERR                      00000055 R      01
SIZ...                      = 00000001    T_EXECUTE                     0000017C R      01
SYS$ALLOC                     00010238    T_EXPECTED                    00000108 R      01
SYS$ASCTIM                    00010248    T_EXP_PSL                     0000039A R      01
SYS$ASSIGN                    00010250    T_GOOD_DATA                   00000332 R      01
SYS$BINTIM                    00010258    T_GPR                         000003F3 R      01
SYS$CANCEL                    00010260    T_GPR_ERR                     000002E0 R      01
SYS$CANTIM                    00010268    T_ISP_ERR1                    00000245 R      01
SYS$CLOSE                     000105B8    T_ISP_ERR2                    00000279 R      01
SYS$CLREF                     00010298    T_KSP_ERR1                    000001E6 R      01
SYS$CONNECT                   000105C0    T_KSP_ERR2                    00000217 R      01
SYS$DALLOC                    000102D8    T_MC_ERR                      000000D7 R      01
SYS$DASSGN                    000102E0    T_MC_MESS                     0000002C R      01
SYS$DISCONNECT                000105D0    T_NOT_ON_IS                   00000373 R      01
SYS$FAO                       00010350    T_NOT_ON_KS                   0000034F R      01
SYS$FAOL                      00010358    T_NOT_READY                   0000014A R      01
SYS$GET                       00010580    T_NOXOR                       00000437 R      01
SYS$GETCHN                    000104C8    T_NO_WCS                      0000044D R      01
SYS$GETTIM                    00010378    T_PSL                         000003DA R      01
SYS$LKWSET                    000103A0    T_SP_ERR1                     000002AA R      01
SYS$NUMTIM                    000103B8    T_SP_ERR2                     000002D4 R      01
SYS$OPEN                      00010608    T_TIMER                       000001A1 R      01
SYS$QIO                       000103C8    T_UNEXP_DATA                  00000115 R      01
SYS$QIOW                      00010200    T_WCS_ERR                     000000AD R      01
SYS$READ                      00010590    T_WTBUSERR                    00000080 R      01
SYS$READEF                    000103D0    T_XFC                         000001C9 R      01
SYS$SETAST                    000103F8    T_XOR                         0000041B R      01
SYS$SETEF                     00010400    V_DONE                      = 00000001
SYS$SETIMR                    00010420    V_ERROR_FLAG                = 00000007
SYS$SETPRI                    00010428    V_EXECUTE_ERR               = 00000002
```

```
V_FATAL_ERR                     = 00000004
V_GPR_ERR                       = 00000006
V_INT                           = 0000000D
V_ISP_ERR                       = 00000009
V_ISTK                          = 0000000B
V_KSP_ERR                       = 00000008
V_MCINT                         = 0000000E
V_MC_ERR                        = 0000000C
V_PSL_ERR                       = 00000005
V_READY                         = 00000000
V_SP_ERR                        = 0000000A
V_TIMER                         = 00000003
V_XFC_ERR                       = 0000000F
WCS                             = 00000007  G
WTBUS_SERVICE                     000008D4 R     01
XFC_SERVICE                       00000AF8 R     01
```

Psect synopsis

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
ECKAXF	00000B04 (2820.)	01 (1.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
ABS	00010610 (67088.)	02 (2.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE
TEST_008	00000313 (787.)	03 (3.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
DISPATCH	00000018 (24.)	04 (4.)	NOPIC USR CON REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG
ARGLIST	00000024 (36.)	05 (5.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC LONG
$TSTCNT	00000004 (4.)	06 (6.)	NOPIC USR OVR REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG

Symbol Cross Reference

SYMBOL	VALUE	DEFINITION	REFERENCES...
$$$	=00000018-R	840 (13)	704 (11) 781 (12) 840 (13)
$$ARGS	=0000000A	83 (3)	83 (3)
$$E	=00000001	840 (13)	732 (11) 809 (12) 877 (13)
$$M	=00000006	872 (13)	654 (10) 726 (11) 803 (12) 872 (13)
$$N	=00000001	872 (13)	#-339 (8) #-340 (8) #-342 (8) #-346 (8)
			#-349 (8) #-351 (8) 354 (8) 356 (8)
			359 (8) 361 (8) 363 (8) 365 (8)
			371 (8) 375 (8) 380 (8) #-382 (8)
			390 (8) 392 (8) #-395 (8) #-397 (8)
			#-404 (8) #-405 (8) #-406 (8) #-410 (8)
			#-413 (8) #-415 (8) #-417 (8) 726 (11)
			803 (12) #-847 (13) 872 (13) 88 (3)
$$S	=FFFFFFFF	881 (13)	645 (10) 654 (10) 659 (11) 704 (11)
			736 (12) 781 (12) 813 (13) 840 (13)
$$T1	=0000002C	83 (3)	83 (3)
$ENV	=00000001	66 (3)	
$ER	=FFFFFFFF	881 (13)	704 (11) #-726 (11) 781 (12) #-803 (12)
			840 (13) #-872 (13)
$MO	=00000001	882 (13)	882 (13)
S	=00000018-R	840 (13)	704 (11) 732 (11) 781 (12) 809 (12)
			840 (13) 877 (13)
$ST	=00000000	881 (13)	654 (10) 659 (11) 704 (11) 726 (11)
			732 (11) 736 (12) 781 (12) 803 (12)
			809 (12) 813 (13) 840 (13) 848 (13)
			872 (13) 877 (13) 881 (13)
$TN	=00000008	882 (13)	645 (10) 654 (10) 659 (11) 726 (11)
			736 (12) 803 (12) 813 (13) 872 (13)
			881 (13) 882 (13)
ALL	=00000009	88 (3)	654 (10)
A_LAST_ADDRESS	=FFFFFFFC	144 (3)	#-717 (11) #-794 (12)
A_MCHK_BUFFER	00000000-XR		#-343 (8) #-384 (8) #-407 (8) #-448 (9)
			#-449 (9) #-476 (9) #-493 (9) #-494 (9)
			#-520 (9) #-577 (9) 609 (9)
A_PSLMNE	00000000-XR		370 (8) 374 (8) 379 (8)
A_WCS_ADDRESS	00000024-R	148 (3)	#-625 (9) #-629 (9) #-863 (13)
A_WCS_ENA_ADDR	00000028-R	150 (3)	#-623 (9)
BASE_008	00000000-R	645 (10)	654 (10)
BIT...	=0000001A	85 (3)	66 (3) 80 (3) 84 (3) 85 (3)
BUFSIZ	=00000080	142 (3)	#-337 (8) #-370 (8) #-374 (8) #-379 (8)
CEP_FUNCTIONAL	=00000000	66 (3)	
CEP_REPAIR	=00000001	66 (3)	66 (3)
CLEAR_BUFFER	00000AA9-R	608 (9)	705 (11) 782 (12) 852 (13)
DATA_008	0000002C-R	654 (10)	654 (10)
DATA_1	00000483-R	256 (5)	#-714 (11)
DATA_2	00000487-R	258 (5)	#-791 (12)
DEFAULT	=00000000	88 (3)	654 (10)
DS$ABORT	00010020		728 (11) 730 (11) 805 (12) 807 (12)
			874 (13)

```
DS$BGNSUB                       00010030                        704     (11)    781     (12)    840     (13)
DS$BREAK                        00010058                        881     (13)
DS$CLRVEC                       00010168                        721     (11)    799     (12)    866     (13)    867     (13)
                                                                880     (13)
DS$CVTREG                       000100B0                        370     (8)     374     (8)     379     (8)
DS$ENDSUB                       00010038                        732     (11)    809     (12)    877     (13)
DS$ERRHARD                      000100D0                        726     (11)    803     (12)    872     (13)
DS$K_ERROR                      =00000002       80      (3)
DS$K_NORMAL                     =00000001       80      (3)
DS$K_SEVERE                     =00000004       80      (3)
DS$K_SUBSYS                     =00000066       80      (3)     80      (3)
DS$K_WARNING                    =00000000       80      (3)
DS$PRINTB                       000100E0                        339     (8)     340     (8)     342     (8)     346     (8)
                                                                349     (8)     351     (8)     354     (8)     359     (8)
                                                                363     (8)     371     (8)     375     (8)     382     (8)
                                                                390     (8)     395     (8)     397     (8)     404     (8)
                                                                405     (8)     406     (8)     410     (8)     413     (8)
                                                                415     (8)     417     (8)
DS$PRINTF                       000100F0                        847     (13)
DS$PRINTSIG                     00010100                        345     (8)     347     (8)     409     (8)     411     (8)
DS$PRINTX                       000100E8                        356     (8)     361     (8)     365     (8)     380     (8)
                                                                392     (8)
DS$SETVEC                       00010160                        655     (10)    707     (11)    784     (12)    853     (13)
                                                                855     (13)
DS$_ARITH                       =006600D0       80      (3)
DS$_ASBE                        =00660118       80      (3)
DS$_BADLINK                     =006600F0       80      (3)
DS$_BADTYPE                     =006600E8       80      (3)
DS$_BIIC                        =00660120       80      (3)
DS$_CHME                        =006600A8       80      (3)
DS$_CHMK                        =006600E0       80      (3)
DS$_DEVNAME                     =00660108       80      (3)
DS$_ERROR                       =00660002       80      (3)
DS$_FHWE                        =00660068       80      (3)
DS$_FRAGBUF                     =00660080       80      (3)
DS$_ICBUSY                      =006600C8       80      (3)
DS$_ICERR                       =006600C0       80      (3)
DS$_IHWE                        =00660060       80      (3)
DS$_ILLCHAR                     =00660018       80      (3)
DS$_ILLPAGCNT                   =00660078       80      (3)
DS$_ILLUNIT                     =00660100       80      (3)
DS$_INSFMEM                     =00660050       80      (3)
DS$_IPL2HI                      =006600B8       80      (3)
DS$_IVADDR                      =00660040       80      (3)
DS$_IVVECT                      =00660038       80      (3)
DS$_KRNLSTK                     =00660090       80      (3)
DS$_LOGIC                       =00660070       80      (3)
DS$_MCHK                        =00660088       80      (3)     298     (7)     315     (7)
DS$_MMOFF                       =00660058       80      (3)
DS$_NEEDUNIT                    =006600F8       80      (3)
DS$_NODE                        =00660128       80      (3)
DS$_NOPCS                       =00660110       80      (3)
DS$_NORMAL                      =00660001       80      (3)
DS$_NOSUPPORT                   =006600B1       80      (3)
DS$_NOTDON                      =00660030       80      (3)
```

```
DS$_NOTIMP                      =006600B0      80      (3)       80      (3)
DS$_NULLSTR                     =00660010      80      (3)
DS$_OVERFLOW                    =00660008      80      (3)
DS$_POWER                       =00660098      80      (3)
DS$_PROGERR                     =00660020      80      (3)
DS$_SEVERE                      =00660004      80      (3)
DS$_TRANSL                      =006600A0      80      (3)
DS$_TRUNCATE                    =00660028      80      (3)
DS$_UNEXPINT                    =006600D8      80      (3)
DS$_VASFULL                     =00660048      80      (3)
DS$_WARNING                     =00660000      80      (3)       80      (3)
DSA$GL_PASSNO                    0000FE54                      #-845    (13)
ENV$M_DOMAIN                    =00000002      66      (3)
ENV$M_LEVEL                     =00000001      66      (3)
ENV$M_SUPER                     =000003FC      66      (3)
ENV$S_DOMAIN                    =00000001      66      (3)
ENV$S_LEVEL                     =00000001      66      (3)
ENV$S_SUPER                     =00000008      66      (3)
ENV$V_DOMAIN                    =00000001      66      (3)       66      (3)
ENV$V_LEVEL                     =00000000      66      (3)       66      (3)
ENV$V_SUPER                     =00000002      66      (3)
ENV$_CPU                        =00000000      66      (3)       66      (3)
ENV$_FUNCTIONAL                 =00000000      66      (3)       66      (3)
ENV$_REPAIR                     =00000001      66      (3)       66      (3)
ENV$_SUPER                      =00000001      66      (3)
ENV$_SYSTEM                     =00000001      66      (3)       66      (3)
ERR$_MSGADR                     =0000000C      83      (3)
ERR$_NARGS                      =0000000A      83      (3)
ERR$_NUM                        =00000004      83      (3)
ERR$_P1                         =00000014      83      (3)      340      (8)      405      (8)
ERR$_P2                         =00000018      83      (3)      347      (8)      411      (8)
ERR$_P3                         =0000001C      83      (3)
ERR$_P4                         =00000020      83      (3)
ERR$_P5                         =00000024      83      (3)
ERR$_P6                         =00000028      83      (3)
ERR$_POINTER                    =00000010      83      (3)
ERR$_UNIT                       =00000008      83      (3)
ERR2_MESSAGE                     000007B6-R    402     (8)      872      (13)
ERROR_CHECK                      00000927-R    517     (9)      724      (11)     801      (12)
ERROR_CHECK1                     00000A48-R    576     (9)      870      (13)
ERR_MESSAGE                      00000543-R    335     (8)      726      (11)     803      (12)
GPR_TABLE                        00000000-XR                    383      (8)      430      (9)      521      (9)
HALT                            =00000004      88      (3)
IPR                             =00000006      88      (3)
KA$W_WCS                         00000036                     #-843     (13)
KA_PTABLE                        00000000-XR                  #-842     (13)
LOAD_GPR                         00000832-R    429     (9)      715      (11)     786      (12)
LOAD_MICRO                       00000AC1-R    618     (9)      851      (13)
L_ACT_ISP                        00000000-XR                  #-359     (8)     #-361     (8)     #-460     (9)     #-505     (9)
                                                              #-547     (9)
L_ACT_KSP                        00000000-XR                  #-354     (8)     #-356     (8)     #-459     (9)     #-504     (9)
                                                              #-543     (9)
L_ACT_PSL                        00000000-XR                  #-374     (8)     #-375     (8)     #-461     (9)     #-506     (9)
                                                               541      (9)     #-550     (9)      555      (9)      560      (9)
L_ACT_SP                         00000000-XR                  #-363     (8)     #-365     (8)     #-458     (9)     #-503     (9)
```

```
                                                        #-538    (9)
L_ADDRESS                  00000004-R   97     (3)
L_COUNT                    00000000-R   96     (3)     #-610    (9)     #-612    (9)
L_CUR_ISP                  00000008-R   98     (3)
L_DATA                    =00000000     145    (3)     #-794    (12)
L_EXP_AP                   00000000-XR                 #-437    (9)
L_EXP_FP                   00000000-XR                 #-438    (9)
L_EXP_ISP                  00000000-XR                 #-359    (8)     #-547    (9)     #-712    (11)    #-789    (12)
L_EXP_KSP                  00000000-XR                 #-354    (8)     #-543    (9)     #-713    (11)    #-790    (12)
L_EXP_MOD                  00000010-R   100    (3)     #-553    (9)     #-555    (9)
L_EXP_PSL                  00000000-XR                 #-370    (8)     #-371    (8)     #-379    (8)     #-380    (8)
                                                        #-550    (9)       553    (9)       558    (9)     #-714    (11)
                                                        #-791    (12)
L_EXP_SP                   00000000-XR                 #-363    (8)     #-538    (9)     #-710    (11)    #-711    (11)
                                                        #-787    (12)    #-788    (12)
L_EXP_STACK                00000014-R   101    (3)     #-558    (9)     #-560    (9)
L_FLAGS                    00000020-R   105    (3)       341    (8)       348    (8)       350    (8)       352    (8)
                                                          353    (8)       357    (8)       358    (8)       362    (8)
                                                          366    (8)       381    (8)       394    (8)       396    (8)
                                                          412    (8)       414    (8)       416    (8)     #-507    (9)
                                                        #-524    (9)       526    (9)     #-536    (9)     #-540    (9)
                                                        #-542    (9)     #-545    (9)       546    (9)     #-549    (9)
                                                        #-562    (9)     #-563    (9)       564    (9)     #-565    (9)
                                                          566    (9)     #-567    (9)       568    (9)     #-569    (9)
                                                        #-587    (9)       588    (9)     #-589    (9)       590    (9)
                                                        #-591    (9)       592    (9)     #-593    (9)     #-602    (9)
                                                        #-638    (9)     #-709    (11)    #-716    (11)    #-718    (11)
                                                          725    (11)      729    (11)    #-785    (12)    #-793    (12)
                                                          795    (12)    #-797    (12)    #-800    (12)      802    (12)
                                                          806    (12)    #-850    (13)    #-856    (13)    #-857    (13)
                                                          871    (13)
L_REV_CHECK                00000000-XR                 #-621    (9)
L_TIMER                    0000001C-R   103    (3)     #-792    (12)    #-796    (12)
MANUAL                    =00000001     88     (3)
MCHK                      =00000005     88     (3)       654    (10)
MICRO_DATA                 0000048B-R   267    (7)       626    (9)
MODELIST                   00000000-XR                   370    (8)       374    (8)       379    (8)
MSG_008                    00000002-R   645    (10)      654    (10)
M_BIT19                   =00080000     140    (3)
M_BIT20                   =00100000     141    (3)     #-629    (9)
M_DONE                    =00000002     110    (3)
M_ERROR_FLAG              =00000080     122    (3)     #-524    (9)     #-536    (9)     #-540    (9)     #-545    (9)
                                                        #-549    (9)     #-563    (9)     #-565    (9)     #-567    (9)
                                                        #-569    (9)     #-587    (9)     #-589    (9)     #-591    (9)
                                                        #-593    (9)
M_EXECUTE_ERR             =00000004     112    (3)     #-718    (11)    #-797    (12)
M_FATAL_ERR               =00000010     116    (3)     #-562    (9)
M_GPR_ERR                 =00000040     120    (3)     #-524    (9)
M_INT                     =00002000     134    (3)     #-800    (12)
M_ISP_ERR                 =00000200     126    (3)     #-549    (9)
M_ISTK                    =00000800     130    (3)     #-542    (9)
M_KSP_ERR                 =00000100     124    (3)     #-545    (9)
M_MCINT                   =00004000     136    (3)     #-507    (9)
M_MC_ERR                  =00001000     132    (3)     #-536    (9)     #-587    (9)
M_PSL_ERR                 =00000020     118    (3)     #-563    (9)
```

```
M_READY                         =00000001      108     (3)     #-716    (11)   #-793    (12)   #-857    (13)
M_SP_ERR                        =00000400      128     (3)     #-540    (9)
M_TIMER                         =00000008      114     (3)     #-602    (9)
M_XFC_ERR                       =00008000      138     (3)     #-638    (9)
PAR$M_ATDEF                     =00000010      84      (3)
PAR$M_ATHI                      =00000008      84      (3)
PAR$M_ATLO                      =00000004      84      (3)
PAR$M_NODEF                     =00000002      84      (3)
PAR$V_ATDEF                     =00000004      84      (3)
PAR$V_ATHI                      =00000003      84      (3)
PAR$V_ATLO                      =00000002      84      (3)
PAR$V_NODEF                     =00000001      84      (3)
PAR$_BIN                        =00000002      84      (3)
PAR$_DEC                        =0000000A      84      (3)
PAR$_HEX                        =00000010      84      (3)
PAR$_NO                         =00000000      84      (3)
PAR$_OCT                        =00000008      84      (3)
PAR$_YES                        =00000001      84      (3)
PCS                             =00000098      88      (3)
POWER_FAIL                      =00000003      88      (3)
PR$_ICCS                         00000000-XR                   #-601    (9)
PR$_ISP                          00000000-XR                   #-460    (9)    #-505    (9)    #-712    (11)   #-789    (12)
PR$_KSP                          00000000-XR                   #-459    (9)    #-504    (9)
PR$_SID                          00000000-XR                   #-619    (9)
PR750$_MCESR                    =00000026                      #-706    (11)   #-783    (12)   #-854    (13)
PSL$K_EXEC                      =00000001      85      (3)
PSL$K_KERNEL                    =00000000      85      (3)
PSL$K_SUPER                     =00000002      85      (3)
PSL$K_USER                      =00000003      85      (3)
PSL$M_CBIT                      =00000001      85      (3)
PSL$M_NBIT                      =00000008      85      (3)
PSL$M_VBIT                      =00000002      85      (3)
PSL$M_ZBIT                      =00000004      85      (3)
PSL$S_CURMOD                    =00000002                      #-552    (9)    #-554    (9)
PSL$V_CBIT                      =00000000      85      (3)
PSL$V_CURMOD                    =00000018                      #-552    (9)    #-554    (9)
PSL$V_IS                        =0000001A                      #-541    (9)    #-557    (9)    #-559    (9)
PSL$V_NBIT                      =00000003      85      (3)
PSL$V_VBIT                      =00000001      85      (3)
PSL$V_ZBIT                      =00000002      85      (3)
READ_GPR                         0000085C-R    447     (9)      707    (11)
READ_MCHK                        000008B8-R    475     (9)      855    (13)
REG_TABLE                        00000000-XR                    387    (8)
RENTRY3                          000000C2-R    720     (11)    #-708    (11)
RENTRY_POINT                     0000000C-R    99      (3)      466    (9)    #-708    (11)
SCB$L_MACHCHK                    00000004                       #-707    (11)   #-721    (11)   #-855    (13)   #-866    (13)
SCB$L_OPCCUS                     00000014                       #-853    (13)   #-867    (13)
SCB$L_TIMER                      000000C0                       #-655    (10)   #-880    (13)
SCB$L_WTBUSERR                  =00000060      143     (3)     #-784    (12)   #-799    (12)
SEP_FUNCTIONAL                  =00000002      66      (3)
SEP_REPAIR                      =00000003      66      (3)
SIZ...                          =00000001      85      (3)      66      (3)      84      (3)      85      (3)
T8_S1                            00000047-R    704     (11)
T8_S1_X                          0000011B-R    732     (11)
T8_S2                            00000126-R    781     (12)
```

```
T8_S2_X                         00000210-R   809    (12)
T8_S3                           0000021B-R   840    (13)
T8_S3_X                         000002F0-R   877    (13)    #-848    (13)
TABLE3                          000004CB-R   297    (7)     #-344    (8)     #-408    (8)     #-723    (11)    #-726    (11)
TABLE4                          00000507-R   314    (7)     #-869    (13)    #-872    (13)
TAG_3                           000000B4-R   717    (11)      302    (7)       310    (7)
TAG_4                           0000028F-R   858    (13)      319    (7)       327    (7)
TEST_008                        00000030-R   654    (10)      654    (10)
TEST_008_X                      0000030B-R   881    (13)
TIMER_SERVICE                   00000AA0-R   600    (9)       655    (10)
TU58                           =00000002     88     (3)
T_ACT_PSL                       000003BB-R   230    (4)       375    (8)
T_BAD_DATA                      00000309-R   215    (4)
T_BUSERR                        00000055-R   163    (4)     #-726    (11)
T_EXECUTE                       0000017C-R   185    (4)       351    (8)
T_EXPECTED                      00000108-R   176    (4)       346    (8)       410    (8)
T_EXP_PSL                       0000039A-R   227    (4)       371    (8)
T_GOOD_DATA                     00000332-R   218    (4)
T_GPR                           000003F3-R   236    (4)       382    (8)
T_GPR_ERR                       000002E0-R   212    (4)
T_ISP_ERR1                      00000245-R   200    (4)       359    (8)
T_ISP_ERR2                      00000279-R   203    (4)       361    (8)
T_KSP_ERR1                      000001E6-R   194    (4)       354    (8)
T_KSP_ERR2                      00000217-R   197    (4)       356    (8)
T_MC_ERR                        000000D7-R   172    (4)       342    (8)       406    (8)
T_MC_MESS                       0000002C-R   160    (4)       339    (8)       404    (8)
T_NOT_ON_IS                     00000373-R   224    (4)
T_NOT_ON_KS                     0000034F-R   221    (4)
T_NOT_READY                     0000014A-R   182    (4)       349    (8)       413    (8)
T_NOXOR                         00000437-R   242    (4)       392    (8)
T_NO_WCS                        0000044D-R   245    (4)       847    (13)
T_PSL                           000003DA-R   233    (4)       380    (8)
T_SP_ERR1                       000002AA-R   206    (4)       363    (8)
T_SP_ERR2                       000002D4-R   209    (4)       365    (8)
T_TIMER                         000001A1-R   188    (4)       395    (8)       415    (8)
T_UNEXP_DATA                    00000115-R   179    (4)
T_WCS_ERR                       000000AD-R   169    (4)     #-872    (13)
T_WTBUSERR                      00000080-R   166    (4)     #-803    (12)
T_XFC                           000001C9-R   191    (4)       397    (8)       417    (8)
T_XOR                           0000041B-R   239    (4)       390    (8)
V_DONE                         =00000001     109    (3)
V_ERROR_FLAG                   =00000007     121    (3)     #-725    (11)    #-802    (12)    #-871    (13)
V_EXECUTE_ERR                  =00000002     111    (3)     #-350    (8)     #-566    (9)
V_FATAL_ERR                    =00000004     115    (3)     #-729    (11)    #-806    (12)
V_GPR_ERR                      =00000006     119    (3)     #-381    (8)
V_INT                          =0000000D     133    (3)     #-526    (9)
V_ISP_ERR                      =00000009     125    (3)     #-358    (8)
V_ISTK                         =0000000B     129    (3)     #-352    (8)     #-357    (8)     #-546    (9)
V_KSP_ERR                      =00000008     123    (3)     #-353    (8)
V_MCINT                        =0000000E     135    (3)     #-795    (12)
V_MC_ERR                       =0000000C     131    (3)     #-341    (8)
V_PSL_ERR                      =00000005     117    (3)     #-366    (8)
V_READY                        =00000000     107    (3)     #-348    (8)     #-412    (8)     #-564    (9)     #-588    (9)
V_SP_ERR                       =0000000A     127    (3)     #-362    (8)
V_TIMER                        =00000003     113    (3)     #-394    (8)     #-414    (8)     #-568    (9)     #-592    (9)
```

```
V_XFC_ERR                       =0000000F     137     (3)     #-396     (8)     #-416     (8)     #-590     (9)
WCS                             =00000007     88      (3)
WTBUS_SERVICE                    000008D4-R   492     (9)       784     (12)
XFC_SERVICE                      00000AF8-R   637     (9)       320     (7)       853     (13)
```

Macros Cross Reference

MACRO	SIZE	DEFINITION	REFERENCES...
$D1_ABPROGRAM	1	728 (11)	728 (11) 730 (11) 805 (12) 807 (12) 874 (13)
$D1_BSUBT	1	704 (11)	704 (11) 781 (12) 840 (13)
$D1_BTEST	1	654 (10)	654 (10)
$D1_ERR	1	726 (11)	726 (11) 803 (12) 872 (13)
$D1_ERR_S	1	726 (11)	726 (11) 803 (12) 872 (13)
$D1_ESUBT	1	732 (11)	732 (11) 809 (12) 877 (13)
$D1_ETEST	1	881 (13)	881 (13)
$D1_EXSUB	1	848 (13)	848 (13)
$D1_PRINT_S	1	339 (8)	339 (8) 340 (8) 342 (8) 346 (8) 349 (8)
			351 (8) 354 (8) 356 (8) 359 (8) 361 (8)
			363 (8) 365 (8) 371 (8) 375 (8) 380 (8)
			382 (8) 390 (8) 392 (8) 395 (8) 397 (8)
			404 (8) 405 (8) 406 (8) 410 (8) 413 (8)
			415 (8) 417 (8) 847 (13)
$D1_SBTTL	2	645 (10)	645 (10) 659 (11) 736 (12) 813 (13)
$D2_BDATA	1	654 (10)	654 (10)
$D2_BTEST	1	654 (10)	654 (10)
$D2_SBTTL	1	645 (10)	645 (10)
$DEF	1	85 (3)	
$DEFINI	1	79 (3)	79 (3) 81 (3) 82 (3) 85 (3) 86 (3)
			87 (3) 89 (3)
$DS_ABORT	1	728 (11)	728 (11) 730 (11) 805 (12) 807 (12) 874 (13)
$DS_BCOMPLETE	1	727 (11)	727 (11) 804 (12) 873 (13)
$DS_BGNMESSAGE	1	336 (8)	336 (8) 403 (8)
$DS_BGNMOD	1	66 (3)	66 (3)
$DS_BGNSUB	1	704 (11)	704 (11) 781 (12) 840 (13)
$DS_BGNTEST	1	654 (10)	654 (10)
$DS_BREAK	1	881 (13)	881 (13)
$DS_CLRVEC_S	1	721 (11)	721 (11) 799 (12) 866 (13) 867 (13) 880 (13)
$DS_CVTREG_S	1	368 (8)	368 (8) 372 (8) 377 (8)
$DS_DSADEF	5	81 (3)	81 (3)
$DS_DSDEF	2	80 (3)	80 (3)
$DS_DSSDEF	8	82 (3)	82 (3)
$DS_ENDDATA	1	654 (10)	654 (10)
$DS_ENDMESSAGE	1	399 (8)	399 (8) 419 (8)
$DS_ENDMOD	1	882 (13)	882 (13)
$DS_ENDSUB	1	732 (11)	732 (11) 809 (12) 877 (13)
$DS_ENDTEST	1	881 (13)	881 (13)
$DS_ENVDEF	2	66 (3)	66 (3)
$DS_ERRDEF	1	83 (3)	83 (3)
$DS_ERRHARD_S	1	726 (11)	726 (11) 803 (12) 872 (13)
$DS_EXIT	1	848 (13)	848 (13)
$DS_HPODEF	2	86 (3)	86 (3)
$DS_KA_DEF	3	87 (3)	87 (3)
$DS_PAGE	1	643 (9)	643 (9) 657 (10) 734 (11) 810 (12) 879 (13)
$DS_PARDEF	1	84 (3)	84 (3)
$DS_PRINTB_S	1	339 (8)	339 (8) 340 (8) 342 (8) 346 (8) 349 (8)
			351 (8) 354 (8) 359 (8) 363 (8) 371 (8)

```
                                                 375    (8)      382    (8)      390    (8)      395    (8)      397    (8)
                                                 404    (8)      405    (8)      406    (8)      410    (8)      413    (8)
                                                 415    (8)      417    (8)
$DS_PRINTF_S      1          847    (13)         847    (13)
$DS_PRINTSIG_G    1          345    (8)          345    (8)      347    (8)      409    (8)      411    (8)
$DS_PRINTX_S      1          356    (8)          356    (8)      361    (8)      365    (8)      380    (8)      392    (8)
$DS_PSLDEF        1          85     (3)          85     (3)
$DS_SBTTL         1          645    (10)         645    (10)     659    (11)     736    (12)     813    (13)
$DS_SCBDEF        3          79     (3)          79     (3)
$DS_SECDEF        1          88     (3)          88     (3)
$DS_SETVEC_S      1          655    (10)         655    (10)     707    (11)     784    (12)     853    (13)     855    (13)
$EQU              1          85     (3)          66     (3)      80     (3)      84     (3)      85     (3)
$EQULS1           1          85     (3)          66     (3)      80     (3)      85     (3)
$EQULST           1          66     (3)          66     (3)      80     (3)      85     (3)
$GBLINI           2          66     (3)          66     (3)      80     (3)      84     (3)      85     (3)
$OFFDEF           1          83     (3)          83     (3)
$PR750DEF         1          89     (3)          89     (3)
$PSLDEF           2          85     (3)          85     (3)
$PUSHADR          1          370    (8)          370    (8)      374    (8)      379    (8)      726    (11)     803    (12)
                                                 872    (13)
$VIELD            1          66     (3)          66     (3)      84     (3)      85     (3)
$VIELD1           1          85     (3)          66     (3)      84     (3)      85     (3)
ECKAX_SECDEF      1          88     (3)          88     (3)

                                          +-------------------------+
                                          ! Performance indicators !
                                          +-------------------------+

Phase                     Page faults    CPU Time       Elapsed Time
-----                     -----------    --------       ------------
Initialization                     30    00:00:00.09    00:00:00.27
Command processing                897    00:00:00.64    00:00:02.26
Pass 1                           1220    00:00:12.45    00:00:39.28
Symbol table sort                   0    00:00:00.60    00:00:01.19
Pass 2                             31    00:00:02.87    00:00:08.71
Symbol table output                 2    00:00:00.24    00:00:01.32
Psect synopsis output               2    00:00:00.02    00:00:00.02
Cross-reference output              7    00:00:01.14    00:00:04.24
Assembler run totals             2191    00:00:18.05    00:00:57.31

The working set limit was 2762 pages.
169085 bytes (331 pages) of virtual memory were used to buffer the intermediate code.
There were 30 pages of symbol table space allocated to hold 570 non-local and 61 local symbols.
883 source lines were read in Pass 1, producing 33 object records in Pass 2.
130 pages of virtual memory were used to define 57 macros.
```

```
                                        +----------------------------+
                                        ! Macro library statistics !
                                        +----------------------------+

Macro library name                       Macros defined
------------------                       --------------
DISK$DIAGPACK02:[TAYLOR.ECKAX]ECKAX.MLB;1              1
SYS$COMMON:[SYSLIB]DIAG.MLB;955                       47
SYS$COMMON:[SYSLIB]STARLET.MLB;2                       9
TOTALS (all libraries)                                57

895 GETS were required to define 57 macros.

There were no errors, warnings or information messages.

MACRO/LIS=ECKAX6.LIS/CROSS ECKAX6
```

Table of contents

(1) 1 ECKAX7: TU58 EXERCISER
(2) 67 DECLARATIONS
(5) 350 COMMAND PACKET TABLE
(40) 2131 END PACKET TABLE
(47) 2474 DATA PACKET TABLE
(52) 2699 COMMAND TABLES
(53) 3122 ERROR MESSAGES
(54) 3334 SUBROUTINES
(56) 3649 TEST 9: TU58 EXERCISER
(57) 3715 SUBTEST 9.1: INITIALIZE
(58) 3819 SUBTEST 9.2: SELF DIAGNOSTIC
(59) 3921 SUBTEST 9.3: NOP
(60) 4026 TEST 10: TU58 EXERCISER READ/WRITE
(61) 4106 SUBTEST 10.1: READ DIRECTORY
(62) 4362 SUBTEST 10.2: WRITE BLOCK
(63) 4523 SUBTEST 10.3: READ BLOCK
(64) 4652 SUBTEST 10.4: WRITE MODIFIED
(65) 4811 SUBTEST 10.5: READ MODIFIED
(66) 4938 SUBTEST 10.6: WRITE RECORD
(67) 5096 SUBTEST 10.7: READ RECORD
(68) 5217 SUBTEST 10.8: WRITE BLOCK - PADDED ZEROS
(69) 5501 SUBTEST 10.9: WRITE RECORD - PADDED ZEROS
(70) 5775 SUBTEST 10.10: BLOCK WRITE - READ
(71) 6050 SUBTEST 10.11: RECORD WRITE - READ
(72) 6318 SUBTEST 10.12: WRITE RECORD INTERRUPT
(73) 6490 SUBTEST 10.13: READ RECORD INTERRUPT
(74) 6619 SUBTEST 10.14: IPL CHECK
(76) 6738 TEST 11: TU58 EXERCISER (WITH MRSP)
(77) 6804 SUBTEST 11.1: INITIALIZE
(78) 6908 SUBTEST 11.2: SELF DIAGNOSTIC
(79) 7010 SUBTEST 11.3: NOP
(80) 7115 TEST 12: TU58 EXERCISER READ/WRITE (WITH MRSP)
(81) 7195 SUBTEST 12.1: READ DIRECTORY
(82) 7451 SUBTEST 12.2: WRITE BLOCK
(83) 7612 SUBTEST 12.3: READ BLOCK
(84) 7741 SUBTEST 12.4: WRITE MODIFIED
(85) 7900 SUBTEST 12.5: READ MODIFIED
(86) 8027 SUBTEST 12.6: WRITE RECORD
(87) 8185 SUBTEST 12.7: READ RECORD
(88) 8306 SUBTEST 12.8: WRITE BLOCK - PADDED ZEROS
(89) 8590 SUBTEST 12.9: WRITE RECORD - PADDED ZEROS
(90) 8864 SUBTEST 12.10: BLOCK WRITE - READ
(91) 9139 SUBTEST 12.11: RECORD WRITE - READ
(92) 9407 SUBTEST 12.12: WRITE RECORD INTERRUPT
(93) 9579 SUBTEST 12.13: READ RECORD INTERRUPT
(94) 9707 SUBTEST 12.14: IPL CHECK

```
0000     1          .SBTTL  ECKAX7: TU58 EXERCISER
0000     2          .TITLE  ECKAX7  VAX-11/750 Specific CPU Cluster Exerciser
0000     3          .IDENT  /5.2/
0000     4
0000     5 ;
0000     6 ; Copyright (C) 1980,1983,1986
0000     7 ; Digital Equipment Corporation, Maynard, Massachusetts 01754
0000     8 ;
0000     9 ; This software is furnished  under a license for use only on a single
0000    10 ; computer  system and  may be  copied only with  the inclusion of the
0000    11 ; above copyright notice.  This software, or any other copies thereof,
0000    12 ; may not be provided or  otherwise made available to any other person
0000    13 ; except for use on such system and to one who agrees to these license
0000    14 ; terms.  Title to and  ownership of the  software  shall at all times
0000    15 ; remain in DEC.
0000    16 ;
0000    17 ; The information in this software is subject to change without notice
0000    18 ; and should  not be construed  as a commitment  by Digital  Equipment
0000    19 ; Corporation.
0000    20 ;
0000    21 ; DEC assumes  no  responsibility  for  the use or  reliability of its
0000    22 ; software on equipment which is not supplied by DEC.
0000    23 ;
0000    24
0000    25 ;++
0000    26 ; Facility:     VAX Architecture Diagnostic.
0000    27 ;
0000    28 ; Abstract:     This module exercises the TU58 tape controller to assure
0000    29 ;               basic functionality. A series of subtests, including the
0000    30 ;               controller's self test are executed checking initialize,
0000    31 ;               no operation, write, read, seek, write modified, read
0000    32 ;               modified, head switching and positioning in RSP and MRSP.
0000    33 ;
0000    34 ;
0000    35 ; Environment:  VAX Diagnostic Supervisor.
0000    36 ;
0000    37 ; Author:       Fred Roemer     17-Feb-81       Version 3.1
0000    38 ;
0000    39 ;       NO CHANGES TO THIS MODULE FOR VERSION 3.3 (DOCUMENT CHANGE ONLY)
0000    40 ;
0000    41 ;
0000    42 ;       Dan Milleville  19-Mar-82               Version 3.4
0000    43 ;       Changed Test 3 exit code to accomodate temporarily a hardware problem.
0000    44 ;
0000    45 ;       Dave Shull      30-Nov-82               Version 4.0
0000    46 ;       Added tests 13 and 14 for coverage of PCS module.
0000    47 ;
0000    48 ;       Tai-Chun Pan    04-Mar-83               Version 5.0
0000    49 ;       Added test 5 for coverage of Processor Halts Architecture Undefined.
0000    50 ;       Added tests 11 and 12 for coverage of new ROM with MRSP of TU58.
0000    51 ;
0000    52 ;       Dan Milleville  21-Nov-83               Version 5.1
0000    53 ;       Fixed error in timer routine (didn't turn off timer).
0000    54 ;
0000    55 ;       Wayne R. Taylor February 1986           Version 5.2
```

```
0000     56 ;       Redefined the IPR's to jive with the starlet library.
0000     57 ;       Modified the code for problem report Eckax5 where:
0000     58 ;               Tests 6 & 13 tests with cache off.
0000     59 ;               Subtest 1 does not check bit 0 of the memory under test.
0000     60 ;               Subtest 4 tests row 0, 1, 2, but not row 3.
0000     61 ;       Modifications were supplied by the submitter.
0000     62 ;       Added $PR750DEF to the macro spec.
0000     63 ;       Search on 5.2.
0000     64 ;
0000     65 ;--
```

```
                     0000     67 .SBTTL  DECLARATIONS
                     0000     68         .LIST   MEB
                     0000     69         .NLIST  CND
                  00000000    70         .PSECT  ECKAXG, PAGE, NOWRT
                     0000     71         .LIBRARY        "SYS$LIBRARY:DIAG"; VAX family diagnostic library.
                     0000     72         $DS_BGNMOD      CEP_REPAIR, TN=9
                     0000        ;;;     Macro-32 Diagnostic macro library Version 8.3 "DIAG.MLB (245)"
                     0000     73
                     0000     74 ;
                     0000     75 ; Include files:
                     0000     76 ;
                     0000     77
                     0000     78         .LIBRARY        "ECKAX"         ; CPU Cluster Exerciser library.
                     0000     79
                     0000     80 ;
                     0000     81 ; Macros:
                     0000     82 ;
                     0000     83
                     0000     87
                     0000     88         $PR750DEF       ; 5.2
                     0000     89         $DS_ERRDEF
                     0000     90         $DS_DSDEF
                     0000     91         $DS_DSSDEF
                     0000     92         $DS_PARDEF
                     0000     93         $DS_SCBDEF
                     0000     94         ECKAX_SECDEF
                     0000     95
                     0000     96 ;
                     0000     97 ; Equated symbols:
                     0000     98 ;
                     0000     99
                     0000    100 ; packet flags
                     0000    101
                  00000001   0000    102 DATA_FLAG=^X01
                  00000002   0000    103 COMMAND_FLAG=^X02
                  00000002   0000    104 END_FLAG=^X02
                  00000004   0000    105 INIT_FLAG=^X04
                  00000010   0000    106 CONTINUE_FLAG=^X10
                  00000011   0000    107 XON_FLAG=^X11
                  00000013   0000    108 XOFF_FLAG=^X13
                     0000    109
                     0000    110 ; op codes
                     0000    111
                  00000000   0000    112 NO_OPERATION=^X00
                  00000001   0000    113 INITIALIZE=^X01
                  00000002   0000    114 READ=^X02
                  00000003   0000    115 WRITE=^X03
                  00000005   0000    116 POSITION=^X05
                  00000007   0000    117 DIAGNOSE=^X07
                  00000040   0000    118 END_CODE=^X40
                     0000    119
                     0000    120 ; packet arguments
                     0000    121
                  00000000   0000    122 SUCCESS_CODE=^X00
                  00000000   0000    123 MODIFIER_00=^X00                    ; Normal operation, no modifier
```

```
00000001  0000   124 MODIFIER_01=^X01                ; Write check modifier
00000080  0000   125 MODIFIER_80=^X80                ; Record addressing modifier
00000000  0000   126 SWITCH_00=^X00
00000008  0000   127 SWITCH_08=^X08
00000000  0000   128 SEQUENCE_H=^X00
00000000  0000   129 SEQUENCE_L=^X00
00000000  0000   130 NOT_USED=^X00
00000000  0000   131 UNIT_0=^X00
00000000  0000   132 SUMMARY_STAT_H=^X00
00000000  0000   133 SUMMARY_STAT_L=^X00
          0000   134
          0000   135 ; bit positions and masks
          0000   136
00000007  0000   137 V_DONE=7
00000007  0000   138 V_READY=7
00000004  0000   139 V_TRANSFER=4
00000010  0000   140 M_TRANSFER=1@4
00000040  0000   141 M_ENABLE=1@6
00000000  0000   142 V_RUN=0
00000001  0000   143 M_RUN=1@0
80000000  0000   144 M_ERROR=1@31
00000080  0000   145 M_INTERRUPT=1@7
00000004  0000   146 V_RESPONSE_FLAG=4
          0000   147
          0000   148 ;PR$_CSTS=^X1E                  ; TU58 transmitter command/status register  5.2
          0000   149 ;PR$_CSTD=^X1F                  ; TU58 transmitter data register            5.2
          0000   150 ;PR$_CSRS=^X1C                  ; TU58 receiver command/status register     5.2
          0000   151 ;PR$_CSRD=^X1D                  ; TU58 receiver data register               5.2
000000F4  0000   152 SCB$L_CSTD=^XF4
000000F0  0000   153 SCB$L_CSRD=^XF0
          0000   154
00000001  0000   155 B_FLAGS:        .BLKB 1        ; contains flags
00000002  0001   156 B_FLAGS2:       .BLKB 1
00000003  0002   157 B_FLAGS3:       .BLKB 1
00000004  0003   158 B_COUNT:        .BLKB 1        ; contains count when repeating
00000005  0004   159 B_COUNT1:       .BLKB 1
00000006  0005   160 B_COUNT2:       .BLKB 1
0000000A  0006   161 L_COUNT:        .BLKL 1
0000000E  000A   162 L_COUNT1:       .BLKL 1
00000012  000E   163 L_COUNT3:       .BLKL 1
00000013  0012   164 B_RESPONSE:    .BLKB 1        ; contains operator responses
00000017  0013   165 BUF_LIM:        .BLKL 1
0000001B  0017   166 TEMP5:          .BLKL 1
0000001F  001B   167 TEMP7:          .BLKL 1
          001F   168
          001F   169 ; bit positions and masks for flags
          001F   170
00000000  001F   171 V_CLOCK_FLAG=0
00000001  001F   172 M_CLOCK_FLAG=1@0
00000001  001F   173 V_RECEIVE_FLAG=1
00000002  001F   174 M_RECEIVE_FLAG=1@1
00000002  001F   175 V_DATA_FLAG=2
00000004  001F   176 M_DATA_FLAG=1@2
00000003  001F   177 V_END_FLAG=3
00000008  001F   178 M_END_FLAG=1@3
```

```
00000004  001F   179 V_SEND_FLAG=4
00000010  001F   180 M_SEND_FLAG=1a4
00000001  001F   181 V_REPEAT_SEND=1
00000002  001F   182 M_REPEAT_SEND=1a1
00000002  001F   183 V_REPEAT_CHECK=2
00000004  001F   184 M_REPEAT_CHECK=1a2
00000000  001F   185 V_DONE_FLAG=0
00000002  001F   186 M_SDONE_FLAG=1a1
00000001  001F   187 V_SDONE_FLAG=1
00000004  001F   188 M_RD_INT_FLAG=1a2
00000002  001F   189 V_RD_INT_FLAG=2
          001F   190
          001F   191
00000600  001F   192 BUFFER_SIZE=1536                ; buffer size to clear buffers
          001F   193
          001F   194 ; delay times for send, receive, and wait timers
          001F   195
FFFB6C20  001F   196 DELAY_TIME1= -300000
FFF85EE0  001F   197 DELAY_TIME2= -500000
FFF3CB00  001F   198 DELAY_TIME3= -800000
FFF0BDC0  001F   199 DELAY_TIME4=-1000000
FFE17B80  001F   200 DELAY_TIME5=-2000000
FFC2F700  001F   201 DELAY_TIME6=-4000000
FF7E4CE0  001F   202 DELAY_TIME7=-8500000
FAEF00C0  001F   203 DELAY_TIME8=-85000000
```

```
                    001F    205 ; Checksum list
                    001F    206
00000001            001F    207 CHECKSUM_01=^X01
00000002            001F    208 CHECKSUM_02=^X02
00000003            001F    209 CHECKSUM_03=^X03
00000004            001F    210 CHECKSUM_04=^X04
00000005            001F    211 CHECKSUM_05=^X05
00000008            001F    212 CHECKSUM_08=^X08
00000009            001F    213 CHECKSUM_09=^X09
0000000A            001F    214 CHECKSUM_0A=^X0A
0000000B            001F    215 CHECKSUM_0B=^X0B
00000001            001F    216 CHECKSUM_01=^X01
0000000C            001F    217 CHECKSUM_0C=^X0C
0000000D            001F    218 CHECKSUM_0D=^X0D
0000000E            001F    219 CHECKSUM_0E=^X0E
0000000F            001F    220 CHECKSUM_0F=^X0F
00000010            001F    221 CHECKSUM_10=^X10
00000011            001F    222 CHECKSUM_11=^X11
00000012            001F    223 CHECKSUM_12=^X12
00000013            001F    224 CHECKSUM_13=^X13
00000014            001F    225 CHECKSUM_14=^X14
00000015            001F    226 CHECKSUM_15=^X15
00000016            001F    227 CHECKSUM_16=^X16
00000019            001F    228 CHECKSUM_19=^X19
0000001A            001F    229 CHECKSUM_1A=^X1A
0000001C            001F    230 CHECKSUM_1C=^X1C
0000001D            001F    231 CHECKSUM_1D=^X1D
0000002D            001F    232 CHECKSUM_2D=^X2D
00000036            001F    233 CHECKSUM_36=^X36
00000041            001F    234 CHECKSUM_41=^X41
00000042            001F    235 CHECKSUM_42=^X42
00000043            001F    236 CHECKSUM_43=^X43
00000054            001F    237 CHECKSUM_54=^X54
0000005C            001F    238 CHECKSUM_5C=^X5C
0000006E            001F    239 CHECKSUM_6E=^X6E
0000006F            001F    240 CHECKSUM_6F=^X6F
00000072            001F    241 CHECKSUM_72=^X72
00000075            001F    242 CHECKSUM_75=^X75
00000079            001F    243 CHECKSUM_79=^X79
00000080            001F    244 CHECKSUM_80=^X80
00000082            001F    245 CHECKSUM_82=^X82
00000083            001F    246 CHECKSUM_83=^X83
00000084            001F    247 CHECKSUM_84=^X84
00000085            001F    248 CHECKSUM_85=^X85
00000088            001F    249 CHECKSUM_88=^X88
00000089            001F    250 CHECKSUM_89=^X89
0000008A            001F    251 CHECKSUM_8A=^X8A
0000008B            001F    252 CHECKSUM_8B=^X8B
0000008C            001F    253 CHECKSUM_8C=^X8C
```

```
0000008D  001F   255 CHECKSUM_8D=^X8D
00000090  001F   256 CHECKSUM_90=^X90
00000091  001F   257 CHECKSUM_91=^X91
00000092  001F   258 CHECKSUM_92=^X92
00000093  001F   259 CHECKSUM_93=^X93
00000094  001F   260 CHECKSUM_94=^X94
00000095  001F   261 CHECKSUM_95=^X95
00000098  001F   262 CHECKSUM_98=^X98
000000A6  001F   263 CHECKSUM_A6=^XA6
000000A9  001F   264 CHECKSUM_A9=^XA9
000000AA  001F   265 CHECKSUM_AA=^XAA
000000AB  001F   266 CHECKSUM_AB=^XAB
000000AE  001F   267 CHECKSUM_AE=^XAE
000000BA  001F   268 CHECKSUM_BA=^XBA
000000BF  001F   269 CHECKSUM_BF=^XBF
000000C0  001F   270 CHECKSUM_C0=^XC0
000000C1  001F   271 CHECKSUM_C1=^XC1
000000C2  001F   272 CHECKSUM_C2=^XC2
000000C5  001F   273 CHECKSUM_C5=^XC5
000000C9  001F   274 CHECKSUM_C9=^XC9
000000DE  001F   275 CHECKSUM_DE=^XDE
000000DF  001F   276 CHECKSUM_DF=^XDF
000000E0  001F   277 CHECKSUM_E0=^XE0
000000E5  001F   278 CHECKSUM_E5=^XE5
000000E8  001F   279 CHECKSUM_E8=^XE8
000000F4  001F   280 CHECKSUM_F4=^XF4
000000F7  001F   281 CHECKSUM_F7=^XF7
000000FA  001F   282 CHECKSUM_FA=^XFA
000000FC  001F   283 CHECKSUM_FC=^XFC
          001F   284
          001F   285 ; Block number list
          001F   286
00000000  001F   287 BLOCK_00=^X00
00000001  001F   288 BLOCK_01=^X01
00000002  001F   289 BLOCK_02=^X02
00000004  001F   290 BLOCK_04=^X04
00000005  001F   291 BLOCK_05=^X05
00000006  001F   292 BLOCK_06=^X06
0000000A  001F   293 BLOCK_0A=^X0A
0000000C  001F   294 BLOCK_0C=^X0C
0000000D  001F   295 BLOCK_0D=^X0D
0000000E  001F   296 BLOCK_0E=^X0E
0000000F  001F   297 BLOCK_0F=^X0F
00000015  001F   298 BLOCK_15=^X15
0000005A  001F   299 BLOCK_5A=^X5A
00000080  001F   300 BLOCK_80=^X80
0000008F  001F   301 BLOCK_8F=^X8F
          001F   302
          001F   303 ; Byte counts
          001F   304
00000000  001F   305 BYTE_COUNT_00=^X00
00000001  001F   306 BYTE_COUNT_01=^X01
00000002  001F   307 BYTE_COUNT_02=^X02
00000004  001F   308 BYTE_COUNT_04=^X04
0000000A  001F   309 BYTE_COUNT_0A=^X0A
```

```
0000001A  001F   310 BYTE_COUNT_1A=^X1A
00000012  001F   311 BYTE_COUNT_12=^X12
00000064  001F   312 BYTE_COUNT_64=^X64
00000074  001F   313 BYTE_COUNT_74=^X74
00000080  001F   314 BYTE_COUNT_80=^X80
000000F4  001F   315 BYTE_COUNT_F4=^XF4
          001F   316
          001F   317 ; data
          001F   318
00000000  001F   319 DATA_0000=^X0000
00000001  001F   320 DATA_0001=^X0001
00000004  001F   321 DATA_0004=^X0004
0000000F  001F   322 DATA_000F=^X000F
00000015  001F   323 DATA_0015=^X0015
00000080  001F   324 DATA_0080=^X0080
000000AA  001F   325 DATA_00AA=^X00AA
000000FF  001F   326 DATA_00FF=^X00FF
00000100  001F   327 DATA_0100=^X0100
00000101  001F   328 DATA_0101=^X0101
00000115  001F   329 DATA_0115=^X0115
00000180  001F   330 DATA_0180=^X0180
00000204  001F   331 DATA_0204=^X0204
00000206  001F   332 DATA_0206=^X0206
0000025A  001F   333 DATA_025A=^X025A
0000065A  001F   334 DATA_065A=^X065A
00000400  001F   335 DATA_0400=^X0400
00000604  001F   336 DATA_0604=^X0604
00000605  001F   337 DATA_0605=^X0605
00000606  001F   338 DATA_0606=^X0606
00000800  001F   339 DATA_0800=^X0800
00000960  001F   340 DATA_0960=^X0960
00001400  001F   341 DATA_1400=^X1400
00001D14  001F   342 DATA_1D14=^X1D14
00004A77  001F   343 DATA_4A77=^X4A77
00007D09  001F   344 DATA_7D09=^X7D09
0000774A  001F   345 DATA_774A=^X774A
0000FFFF  001F   346 DATA_FFFF=^XFFFF
          001F   347
          001F   348
```

```
                     001F    350 .SBTTL  COMMAND PACKET TABLE
                     001F    351
                     001F    352 ; Single byte commands
                     001F    353
                     001F    354 B_INIT_DRIVE:                               ; initialize drive
                  04 001F    355         .BYTE INIT_FLAG
                  04 0020    356         .BYTE INIT_FLAG
                     0021    357
                     0021    358 B_ZEROS:                                    ; zero bytes for init sequence
                0000 0021    359         .WORD   DATA_0000
                     0023    360
                     0023    361 B_CONTINUE:                                 ; continue
                  10 0023    362         .BYTE CONTINUE_FLAG
                     0024    363
                     0024    364 ; Multiple byte commands
                     0024    365
                     0024    366
                     0024    367 ; commands for RSP
                     0024    368
                     0024    369 B_INIT_CMD:
                  02 0024    370         .BYTE   COMMAND_FLAG
                  0A 0025    371         .BYTE   BYTE_COUNT_0A               ; byte count for command packet
                  01 0026    372         .BYTE   INITIALIZE                  ; command
                  00 0027    373         .BYTE   MODIFIER_00
                  00 0028    374         .BYTE   UNIT_0
                  00 0029    375         .BYTE   SWITCH_00
                  00 002A    376         .BYTE   SEQUENCE_L
                  00 002B    377         .BYTE   SEQUENCE_H
                  00 002C    378         .BYTE   BYTE_COUNT_00               ; low (data)
                  00 002D    379         .BYTE   BYTE_COUNT_00               ; high (data)
                  00 002E    380         .BYTE   BLOCK_00                    ; low
                  00 002F    381         .BYTE   BLOCK_00                    ; high
                  03 0030    382         .BYTE   CHECKSUM_03                 ; low
                  0A 0031    383         .BYTE   CHECKSUM_0A                 ; high
                     0032    384
                     0032    385
                     0032    386 B_NOP_CMD:
                  02 0032    387         .BYTE   COMMAND_FLAG
                  0A 0033    388         .BYTE   BYTE_COUNT_0A
                  00 0034    389         .BYTE   NO_OPERATION                ; command
                  00 0035    390         .BYTE   MODIFIER_00
                  00 0036    391         .BYTE   UNIT_0
                  00 0037    392         .BYTE   SWITCH_00
                  00 0038    393         .BYTE   SEQUENCE_L
                  00 0039    394         .BYTE   SEQUENCE_H
                  00 003A    395         .BYTE   BYTE_COUNT_00               ; low (data)
                  00 003B    396         .BYTE   BYTE_COUNT_00               ; high (data)
                  00 003C    397         .BYTE   BLOCK_00                    ; low
                  00 003D    398         .BYTE   BLOCK_00                    ; high
                  02 003E    399         .BYTE   CHECKSUM_02                 ; low
                  0A 003F    400         .BYTE   CHECKSUM_0A                 ; high
                     0040    401
                     0040    402
                     0040    403 B_DIAGNOSE_CMD:
                  02 0040    404         .BYTE   COMMAND_FLAG
```

```
0A  0041   405          .BYTE   BYTE_COUNT_0A
07  0042   406          .BYTE   DIAGNOSE                ; command
00  0043   407          .BYTE   MODIFIER_00
00  0044   408          .BYTE   UNIT_0
00  0045   409          .BYTE   SWITCH_00
00  0046   410          .BYTE   SEQUENCE_L
00  0047   411          .BYTE   SEQUENCE_H
00  0048   412          .BYTE   BYTE_COUNT_00           ; low (data)
00  0049   413          .BYTE   BYTE_COUNT_00           ; high (data)
00  004A   414          .BYTE   BLOCK_00                ; low
00  004B   415          .BYTE   BLOCK_00                ; high
09  004C   416          .BYTE   CHECKSUM_09             ; low
0A  004D   417          .BYTE   CHECKSUM_0A             ; high
       004E   418
```

```
                004E    420 B_READ_1_CMD:
02              004E    421         .BYTE   COMMAND_FLAG
0A              004F    422         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              0050    423         .BYTE   READ                    ; command
00              0051    424         .BYTE   MODIFIER_00
00              0052    425         .BYTE   UNIT_0
00              0053    426         .BYTE   SWITCH_00
00              0054    427         .BYTE   SEQUENCE_L
00              0055    428         .BYTE   SEQUENCE_H
80              0056    429         .BYTE   BYTE_COUNT_80           ; low (data)
00              0057    430         .BYTE   BYTE_COUNT_00           ; high (data)
06              0058    431         .BYTE   BLOCK_06                ; low
00              0059    432         .BYTE   BLOCK_00                ; high
8A              005A    433         .BYTE   CHECKSUM_8A             ; low
0A              005B    434         .BYTE   CHECKSUM_0A             ; high
                005C    435
                005C    436
                005C    437 B_WRITE_1_CMD:
02              005C    438         .BYTE   COMMAND_FLAG
0A              005D    439         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              005E    440         .BYTE   WRITE                   ; command
00              005F    441         .BYTE   MODIFIER_00
00              0060    442         .BYTE   UNIT_0
00              0061    443         .BYTE   SWITCH_00
00              0062    444         .BYTE   SEQUENCE_L
00              0063    445         .BYTE   SEQUENCE_H
12              0064    446         .BYTE   BYTE_COUNT_12           ; low (data)
00              0065    447         .BYTE   BYTE_COUNT_00           ; high (data)
06              0066    448         .BYTE   BLOCK_06                ; low
00              0067    449         .BYTE   BLOCK_00                ; high
1D              0068    450         .BYTE   CHECKSUM_1D             ; low
0A              0069    451         .BYTE   CHECKSUM_0A             ; high
                006A    452
                006A    453
                006A    454 B_WRITE_2_CMD:
02              006A    455         .BYTE   COMMAND_FLAG
0A              006B    456         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              006C    457         .BYTE   WRITE                   ; command
00              006D    458         .BYTE   MODIFIER_00
00              006E    459         .BYTE   UNIT_0
00              006F    460         .BYTE   SWITCH_00
00              0070    461         .BYTE   SEQUENCE_L
00              0071    462         .BYTE   SEQUENCE_H
00              0072    463         .BYTE   BYTE_COUNT_00           ; low (data)
02              0073    464         .BYTE   BYTE_COUNT_02           ; high (data)
0A              0074    465         .BYTE   BLOCK_0A                ; low
00              0075    466         .BYTE   BLOCK_00                ; high
0F              0076    467         .BYTE   CHECKSUM_0F             ; low
0C              0077    468         .BYTE   CHECKSUM_0C             ; high
```

```
                0078   470 B_READ_2_CMD:
02              0078   471         .BYTE   COMMAND_FLAG
0A              0079   472         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              007A   473         .BYTE   READ                    ; command
00              007B   474         .BYTE   MODIFIER_00
00              007C   475         .BYTE   UNIT_0
00              007D   476         .BYTE   SWITCH_00
00              007E   477         .BYTE   SEQUENCE_L
00              007F   478         .BYTE   SEQUENCE_H
00              0080   479         .BYTE   BYTE_COUNT_00           ; low (data)
02              0081   480         .BYTE   BYTE_COUNT_02           ; high (data)
0A              0082   481         .BYTE   BLOCK_0A                ; low
00              0083   482         .BYTE   BLOCK_00                ; high
0E              0084   483         .BYTE   CHECKSUM_0E             ; low
0C              0085   484         .BYTE   CHECKSUM_0C             ; high
                0086   485
                0086   486
                0086   487 B_WRITE_3_CMD:
02              0086   488         .BYTE   COMMAND_FLAG
0A              0087   489         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              0088   490         .BYTE   WRITE                   ; command
80              0089   491         .BYTE   MODIFIER_80
00              008A   492         .BYTE   UNIT_0
00              008B   493         .BYTE   SWITCH_00
00              008C   494         .BYTE   SEQUENCE_L
00              008D   495         .BYTE   SEQUENCE_H
80              008E   496         .BYTE   BYTE_COUNT_80           ; low (data)
00              008F   497         .BYTE   BYTE_COUNT_00           ; high (data)
0E              0090   498         .BYTE   BLOCK_0E                ; low
00              0091   499         .BYTE   BLOCK_00                ; high
93              0092   500         .BYTE   CHECKSUM_93             ; low
8A              0093   501         .BYTE   CHECKSUM_8A             ; high
                0094   502
                0094   503
                0094   504 B_READ_3_CMD:
02              0094   505         .BYTE   COMMAND_FLAG
0A              0095   506         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              0096   507         .BYTE   READ                    ; command
80              0097   508         .BYTE   MODIFIER_80
00              0098   509         .BYTE   UNIT_0
00              0099   510         .BYTE   SWITCH_00
00              009A   511         .BYTE   SEQUENCE_L
00              009B   512         .BYTE   SEQUENCE_H
80              009C   513         .BYTE   BYTE_COUNT_80           ; low (data)
00              009D   514         .BYTE   BYTE_COUNT_00           ; high (data)
0E              009E   515         .BYTE   BLOCK_0E                ; low
00              009F   516         .BYTE   BLOCK_00                ; high
92              00A0   517         .BYTE   CHECKSUM_92             ; low
8A              00A1   518         .BYTE   CHECKSUM_8A             ; high
```

```
                00A2    520 B_WRITE_4_CMD:
02              00A2    521         .BYTE   COMMAND_FLAG
0A              00A3    522         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              00A4    523         .BYTE   WRITE                   ; command
01              00A5    524         .BYTE   MODIFIER_01
00              00A6    525         .BYTE   UNIT_0
00              00A7    526         .BYTE   SWITCH_00
00              00A8    527         .BYTE   SEQUENCE_L
00              00A9    528         .BYTE   SEQUENCE_H
00              00AA    529         .BYTE   BYTE_COUNT_00           ; low (data)
02              00AB    530         .BYTE   BYTE_COUNT_02           ; high (data)
0C              00AC    531         .BYTE   BLOCK_0C                ; low
00              00AD    532         .BYTE   BLOCK_00                ; high
11              00AE    533         .BYTE   CHECKSUM_11             ; low
0D              00AF    534         .BYTE   CHECKSUM_0D             ; high
                00B0    535
                00B0    536
                00B0    537 B_READ_4_CMD:
02              00B0    538         .BYTE   COMMAND_FLAG
0A              00B1    539         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              00B2    540         .BYTE   READ                    ; command
01              00B3    541         .BYTE   MODIFIER_01
00              00B4    542         .BYTE   UNIT_0
00              00B5    543         .BYTE   SWITCH_00
00              00B6    544         .BYTE   SEQUENCE_L
00              00B7    545         .BYTE   SEQUENCE_H
00              00B8    546         .BYTE   BYTE_COUNT_00           ; low (data)
02              00B9    547         .BYTE   BYTE_COUNT_02           ; high (data)
0C              00BA    548         .BYTE   BLOCK_0C                ; low
00              00BB    549         .BYTE   BLOCK_00                ; high
10              00BC    550         .BYTE   CHECKSUM_10             ; low
0D              00BD    551         .BYTE   CHECKSUM_0D             ; high
                00BE    552
                00BE    553
                00BE    554 B_WRITE_5_CMD:
02              00BE    555         .BYTE   COMMAND_FLAG
0A              00BF    556         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              00C0    557         .BYTE   WRITE                   ; command
00              00C1    558         .BYTE   MODIFIER_00
00              00C2    559         .BYTE   UNIT_0
00              00C3    560         .BYTE   SWITCH_00
00              00C4    561         .BYTE   SEQUENCE_L
00              00C5    562         .BYTE   SEQUENCE_H
00              00C6    563         .BYTE   BYTE_COUNT_00           ; low (data)
02              00C7    564         .BYTE   BYTE_COUNT_02           ; high (data)
0F              00C8    565         .BYTE   BLOCK_0F                ; low
00              00C9    566         .BYTE   BLOCK_00                ; high
14              00CA    567         .BYTE   CHECKSUM_14             ; low
0C              00CB    568         .BYTE   CHECKSUM_0C             ; high
                00CC    569
```

```
                00CC    571 B_WRITE_6_CMD:
 02             00CC    572         .BYTE   COMMAND_FLAG
 0A             00CD    573         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
 03             00CE    574         .BYTE   WRITE                   ; command
 00             00CF    575         .BYTE   MODIFIER_00
 00             00D0    576         .BYTE   UNIT_0
 00             00D1    577         .BYTE   SWITCH_00
 00             00D2    578         .BYTE   SEQUENCE_L
 00             00D3    579         .BYTE   SEQUENCE_H
 00             00D4    580         .BYTE   BYTE_COUNT_00           ; low (data)
 02             00D5    581         .BYTE   BYTE_COUNT_02           ; high (data)
 8F             00D6    582         .BYTE   BLOCK_8F                ; low
 00             00D7    583         .BYTE   BLOCK_00                ; high
 94             00D8    584         .BYTE   CHECKSUM_94             ; low
 0C             00D9    585         .BYTE   CHECKSUM_0C             ; high
                00DA    586
                00DA    587
                00DA    588 B_WRITE_7_CMD:
 02             00DA    589         .BYTE   COMMAND_FLAG
 0A             00DB    590         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
 03             00DC    591         .BYTE   WRITE                   ; command
 00             00DD    592         .BYTE   MODIFIER_00
 00             00DE    593         .BYTE   UNIT_0
 00             00DF    594         .BYTE   SWITCH_00
 00             00E0    595         .BYTE   SEQUENCE_L
 00             00E1    596         .BYTE   SEQUENCE_H
 01             00E2    597         .BYTE   BYTE_COUNT_01           ; low (data)
 00             00E3    598         .BYTE   BYTE_COUNT_00           ; high (data)
 0F             00E4    599         .BYTE   BLOCK_0F                ; low
 00             00E5    600         .BYTE   BLOCK_00                ; high
 15             00E6    601         .BYTE   CHECKSUM_15             ; low
 0A             00E7    602         .BYTE   CHECKSUM_0A             ; high
                00E8    603
                00E8    604
                00E8    605 B_READ_5_CMD:
 02             00E8    606         .BYTE   COMMAND_FLAG
 0A             00E9    607         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
 02             00EA    608         .BYTE   READ                    ; command
 00             00EB    609         .BYTE   MODIFIER_00
 00             00EC    610         .BYTE   UNIT_0
 00             00ED    611         .BYTE   SWITCH_00
 00             00EE    612         .BYTE   SEQUENCE_L
 00             00EF    613         .BYTE   SEQUENCE_H
 00             00F0    614         .BYTE   BYTE_COUNT_00           ; low (data)
 02             00F1    615         .BYTE   BYTE_COUNT_02           ; high (data)
 0F             00F2    616         .BYTE   BLOCK_0F                ; low
 00             00F3    617         .BYTE   BLOCK_00                ; high
 13             00F4    618         .BYTE   CHECKSUM_13             ; low
 0C             00F5    619         .BYTE   CHECKSUM_0C             ; high
                00F6    620
```

```
                00F6   622 B_READ_6_CMD:
02              00F6   623          .BYTE   COMMAND_FLAG
0A              00F7   624          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              00F8   625          .BYTE   READ                    ; command
00              00F9   626          .BYTE   MODIFIER_00
00              00FA   627          .BYTE   UNIT_0
00              00FB   628          .BYTE   SWITCH_00
00              00FC   629          .BYTE   SEQUENCE_L
00              00FD   630          .BYTE   SEQUENCE_H
00              00FE   631          .BYTE   BYTE_COUNT_00           ; low (data)
02              00FF   632          .BYTE   BYTE_COUNT_02           ; high (data)
8F              0100   633          .BYTE   BLOCK_8F                ; low
00              0101   634          .BYTE   BLOCK_00                ; high
93              0102   635          .BYTE   CHECKSUM_93             ; low
0C              0103   636          .BYTE   CHECKSUM_0C             ; high
                0104   637
                0104   638
                0104   639 B_WRITE_8_CMD:
02              0104   640          .BYTE   COMMAND_FLAG
0A              0105   641          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              0106   642          .BYTE   WRITE                   ; command
80              0107   643          .BYTE   MODIFIER_80
00              0108   644          .BYTE   UNIT_0
00              0109   645          .BYTE   SWITCH_00
00              010A   646          .BYTE   SEQUENCE_L
00              010B   647          .BYTE   SEQUENCE_H
80              010C   648          .BYTE   BYTE_COUNT_80           ; low (data)
00              010D   649          .BYTE   BYTE_COUNT_00           ; high (data)
0D              010E   650          .BYTE   BLOCK_0D                ; low
00              010F   651          .BYTE   BLOCK_00                ; high
92              0110   652          .BYTE   CHECKSUM_92             ; low
8A              0111   653          .BYTE   CHECKSUM_8A             ; high
                0112   654
                0112   655
                0112   656 B_WRITE_9_CMD:
02              0112   657          .BYTE   COMMAND_FLAG
0A              0113   658          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              0114   659          .BYTE   WRITE                   ; command
80              0115   660          .BYTE   MODIFIER_80
00              0116   661          .BYTE   UNIT_0
00              0117   662          .BYTE   SWITCH_00
00              0118   663          .BYTE   SEQUENCE_L
00              0119   664          .BYTE   SEQUENCE_H
80              011A   665          .BYTE   BYTE_COUNT_80           ; low (data)
00              011B   666          .BYTE   BYTE_COUNT_00           ; high (data)
0D              011C   667          .BYTE   BLOCK_0D                ; low
02              011D   668          .BYTE   BLOCK_02                ; high
92              011E   669          .BYTE   CHECKSUM_92             ; low
8C              011F   670          .BYTE   CHECKSUM_8C             ; high
                0120   671
```

```
                0120   673 B_WRITE_10_CMD:
02              0120   674         .BYTE   COMMAND_FLAG
0A              0121   675         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              0122   676         .BYTE   WRITE                   ; command
80              0123   677         .BYTE   MODIFIER_80
00              0124   678         .BYTE   UNIT_0
00              0125   679         .BYTE   SWITCH_00
00              0126   680         .BYTE   SEQUENCE_L
00              0127   681         .BYTE   SEQUENCE_H
01              0128   682         .BYTE   BYTE_COUNT_01           ; low (data)
00              0129   683         .BYTE   BYTE_COUNT_00           ; high (data)
0D              012A   684         .BYTE   BLOCK_0D                ; low
00              012B   685         .BYTE   BLOCK_00                ; high
13              012C   686         .BYTE   CHECKSUM_13             ; low
8A              012D   687         .BYTE   CHECKSUM_8A             ; high
                012E   688
                012E   689
                012E   690 B_READ_7_CMD:
02              012E   691         .BYTE   COMMAND_FLAG
0A              012F   692         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              0130   693         .BYTE   READ                    ; command
80              0131   694         .BYTE   MODIFIER_80
00              0132   695         .BYTE   UNIT_0
00              0133   696         .BYTE   SWITCH_00
00              0134   697         .BYTE   SEQUENCE_L
00              0135   698         .BYTE   SEQUENCE_H
80              0136   699         .BYTE   BYTE_COUNT_80           ; low (data)
00              0137   700         .BYTE   BYTE_COUNT_00           ; high (data)
0D              0138   701         .BYTE   BLOCK_0D                ; low
00              0139   702         .BYTE   BLOCK_00                ; high
91              013A   703         .BYTE   CHECKSUM_91             ; low
8A              013B   704         .BYTE   CHECKSUM_8A             ; high
                013C   705
                013C   706
                013C   707 B_READ_8_CMD:
02              013C   708         .BYTE   COMMAND_FLAG
0A              013D   709         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              013E   710         .BYTE   READ                    ; command
80              013F   711         .BYTE   MODIFIER_80
00              0140   712         .BYTE   UNIT_0
00              0141   713         .BYTE   SWITCH_00
00              0142   714         .BYTE   SEQUENCE_L
00              0143   715         .BYTE   SEQUENCE_H
80              0144   716         .BYTE   BYTE_COUNT_80           ; low (data)
00              0145   717         .BYTE   BYTE_COUNT_00           ; high (data)
0D              0146   718         .BYTE   BLOCK_0D                ; low
02              0147   719         .BYTE   BLOCK_02                ; high
91              0148   720         .BYTE   CHECKSUM_91             ; low
8C              0149   721         .BYTE   CHECKSUM_8C             ; high
                014A   722
```

```
                014A    724 B_WRITE_11_CMD:
02              014A    725         .BYTE   COMMAND_FLAG
0A              014B    726         .BYTE   BYTE_COUNT_0A          ; byte count for command packet
03              014C    727         .BYTE   WRITE                  ; command
00              014D    728         .BYTE   MODIFIER_00
00              014E    729         .BYTE   UNIT_0
00              014F    730         .BYTE   SWITCH_00
00              0150    731         .BYTE   SEQUENCE_L
00              0151    732         .BYTE   SEQUENCE_H
00              0152    733         .BYTE   BYTE_COUNT_00          ; low (data)
04              0153    734         .BYTE   BYTE_COUNT_04          ; high (data)
00              0154    735         .BYTE   BLOCK_00               ; low
00              0155    736         .BYTE   BLOCK_00               ; high
05              0156    737         .BYTE   CHECKSUM_05            ; low
0E              0157    738         .BYTE   CHECKSUM_0E            ; high
                0158    739
                0158    740
                0158    741 B_READ_9_CMD:
02              0158    742         .BYTE   COMMAND_FLAG
0A              0159    743         .BYTE   BYTE_COUNT_0A          ; byte count for command packet
02              015A    744         .BYTE   READ                   ; command
00              015B    745         .BYTE   MODIFIER_00
00              015C    746         .BYTE   UNIT_0
00              015D    747         .BYTE   SWITCH_00
00              015E    748         .BYTE   SEQUENCE_L
00              015F    749         .BYTE   SEQUENCE_H
00              0160    750         .BYTE   BYTE_COUNT_00          ; low (data)
04              0161    751         .BYTE   BYTE_COUNT_04          ; high (data)
00              0162    752         .BYTE   BLOCK_00               ; low
00              0163    753         .BYTE   BLOCK_00               ; high
04              0164    754         .BYTE   CHECKSUM_04            ; low
0E              0165    755         .BYTE   CHECKSUM_0E            ; high
                0166    756
                0166    757
                0166    758 B_WRITE_12_CMD:
02              0166    759         .BYTE   COMMAND_FLAG
0A              0167    760         .BYTE   BYTE_COUNT_0A          ; byte count for command packet
03              0168    761         .BYTE   WRITE                  ; command
00              0169    762         .BYTE   MODIFIER_00
00              016A    763         .BYTE   UNIT_0
00              016B    764         .BYTE   SWITCH_00
00              016C    765         .BYTE   SEQUENCE_L
00              016D    766         .BYTE   SEQUENCE_H
00              016E    767         .BYTE   BYTE_COUNT_00          ; low (data)
02              016F    768         .BYTE   BYTE_COUNT_02          ; high (data)
80              0170    769         .BYTE   BLOCK_80               ; low
01              0171    770         .BYTE   BLOCK_01               ; high
85              0172    771         .BYTE   CHECKSUM_85            ; low
0D              0173    772         .BYTE   CHECKSUM_0D            ; high
                0174    773
```

```
                0174   775 B_READ_10_CMD:
02              0174   776         .BYTE   COMMAND_FLAG
0A              0175   777         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              0176   778         .BYTE   READ                    ; command
00              0177   779         .BYTE   MODIFIER_00
00              0178   780         .BYTE   UNIT_0
00              0179   781         .BYTE   SWITCH_00
00              017A   782         .BYTE   SEQUENCE_L
00              017B   783         .BYTE   SEQUENCE_H
00              017C   784         .BYTE   BYTE_COUNT_00           ; low (data)
02              017D   785         .BYTE   BYTE_COUNT_02           ; high (data)
80              017E   786         .BYTE   BLOCK_80                ; low
01              017F   787         .BYTE   BLOCK_01                ; high
84              0180   788         .BYTE   CHECKSUM_84             ; low
0D              0181   789         .BYTE   CHECKSUM_0D             ; high
                0182   790
                0182   791
                0182   792 B_WRITE_13_CMD:
02              0182   793         .BYTE   COMMAND_FLAG
0A              0183   794         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              0184   795         .BYTE   WRITE                   ; command
00              0185   796         .BYTE   MODIFIER_00
00              0186   797         .BYTE   UNIT_0
00              0187   798         .BYTE   SWITCH_00
00              0188   799         .BYTE   SEQUENCE_L
00              0189   800         .BYTE   SEQUENCE_H
00              018A   801         .BYTE   BYTE_COUNT_00           ; low (data)
02              018B   802         .BYTE   BYTE_COUNT_02           ; high (data)
00              018C   803         .BYTE   BLOCK_00                ; low
01              018D   804         .BYTE   BLOCK_01                ; high
05              018E   805         .BYTE   CHECKSUM_05             ; low
0D              018F   806         .BYTE   CHECKSUM_0D             ; high
                0190   807
                0190   808
                0190   809 B_READ_11_CMD:
02              0190   810         .BYTE   COMMAND_FLAG
0A              0191   811         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              0192   812         .BYTE   READ                    ; command
00              0193   813         .BYTE   MODIFIER_00
00              0194   814         .BYTE   UNIT_0
00              0195   815         .BYTE   SWITCH_00
00              0196   816         .BYTE   SEQUENCE_L
00              0197   817         .BYTE   SEQUENCE_H
00              0198   818         .BYTE   BYTE_COUNT_00           ; low (data)
02              0199   819         .BYTE   BYTE_COUNT_02           ; high (data)
00              019A   820         .BYTE   BLOCK_00                ; low
01              019B   821         .BYTE   BLOCK_01                ; high
04              019C   822         .BYTE   CHECKSUM_04             ; low
0D              019D   823         .BYTE   CHECKSUM_0D             ; high
                019E   824
```

```
                019E    826 B_WRITE_14_CMD:
02              019E    827         .BYTE   COMMAND_FLAG
0A              019F    828         .BYTE   BYTE_COUNT_0A          ; byte count for command packet
03              01A0    829         .BYTE   WRITE                  ; command
00              01A1    830         .BYTE   MODIFIER_00
00              01A2    831         .BYTE   UNIT_0
00              01A3    832         .BYTE   SWITCH_00
00              01A4    833         .BYTE   SEQUENCE_L
00              01A5    834         .BYTE   SEQUENCE_H
F4              01A6    835         .BYTE   BYTE_COUNT_F4          ; low (data)
01              01A7    836         .BYTE   BYTE_COUNT_01          ; high (data)
01              01A8    837         .BYTE   BLOCK_01               ; low
01              01A9    838         .BYTE   BLOCK_01               ; high
FA              01AA    839         .BYTE   CHECKSUM_FA            ; low
0C              01AB    840         .BYTE   CHECKSUM_0C            ; high
                01AC    841
                01AC    842
                01AC    843 B_READ_12_CMD:
02              01AC    844         .BYTE   COMMAND_FLAG
0A              01AD    845         .BYTE   BYTE_COUNT_0A          ; byte count for command packet
02              01AE    846         .BYTE   READ                   ; command
00              01AF    847         .BYTE   MODIFIER_00
00              01B0    848         .BYTE   UNIT_0
00              01B1    849         .BYTE   SWITCH_00
00              01B2    850         .BYTE   SEQUENCE_L
00              01B3    851         .BYTE   SEQUENCE_H
00              01B4    852         .BYTE   BYTE_COUNT_00          ; low (data)
02              01B5    853         .BYTE   BYTE_COUNT_02          ; high (data)
01              01B6    854         .BYTE   BLOCK_01               ; low
01              01B7    855         .BYTE   BLOCK_01               ; high
05              01B8    856         .BYTE   CHECKSUM_05            ; low
0D              01B9    857         .BYTE   CHECKSUM_0D            ; high
                01BA    858
                01BA    859
                01BA    860 B_WRITE_15_CMD:
02              01BA    861         .BYTE   COMMAND_FLAG
0A              01BB    862         .BYTE   BYTE_COUNT_0A          ; byte count for command packet
03              01BC    863         .BYTE   WRITE                  ; command
00              01BD    864         .BYTE   MODIFIER_00
00              01BE    865         .BYTE   UNIT_0
00              01BF    866         .BYTE   SWITCH_00
00              01C0    867         .BYTE   SEQUENCE_L
00              01C1    868         .BYTE   SEQUENCE_H
00              01C2    869         .BYTE   BYTE_COUNT_00          ; low (data)
02              01C3    870         .BYTE   BYTE_COUNT_02          ; high (data)
15              01C4    871         .BYTE   BLOCK_15               ; low
00              01C5    872         .BYTE   BLOCK_00               ; high
1A              01C6    873         .BYTE   CHECKSUM_1A            ; low
0C              01C7    874         .BYTE   CHECKSUM_0C            ; high
                01C8    875
```

```
                01C8    877 B_READ_13_CMD:
02              01C8    878             .BYTE   COMMAND_FLAG
0A              01C9    879             .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              01CA    880             .BYTE   READ                    ; command
00              01CB    881             .BYTE   MODIFIER_00
00              01CC    882             .BYTE   UNIT_0
00              01CD    883             .BYTE   SWITCH_00
00              01CE    884             .BYTE   SEQUENCE_L
00              01CF    885             .BYTE   SEQUENCE_H
00              01D0    886             .BYTE   BYTE_COUNT_00           ; low (data)
02              01D1    887             .BYTE   BYTE_COUNT_02           ; high (data)
15              01D2    888             .BYTE   BLOCK_15                ; low
00              01D3    889             .BYTE   BLOCK_00                ; high
19              01D4    890             .BYTE   CHECKSUM_19             ; low
0C              01D5    891             .BYTE   CHECKSUM_0C             ; high
                01D6    892
                01D6    893
                01D6    894 B_WRITE_16_CMD:
02              01D6    895             .BYTE   COMMAND_FLAG
0A              01D7    896             .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              01D8    897             .BYTE   WRITE                   ; command
00              01D9    898             .BYTE   MODIFIER_00
00              01DA    899             .BYTE   UNIT_0
00              01DB    900             .BYTE   SWITCH_00
00              01DC    901             .BYTE   SEQUENCE_L
00              01DD    902             .BYTE   SEQUENCE_H
00              01DE    903             .BYTE   BYTE_COUNT_00           ; low (data)
02              01DF    904             .BYTE   BYTE_COUNT_02           ; high (data)
15              01E0    905             .BYTE   BLOCK_15                ; low
01              01E1    906             .BYTE   BLOCK_01                ; high
1A              01E2    907             .BYTE   CHECKSUM_1A             ; low
0D              01E3    908             .BYTE   CHECKSUM_0D             ; high
                01E4    909
                01E4    910
                01E4    911 B_READ_14_CMD:
02              01E4    912             .BYTE   COMMAND_FLAG
0A              01E5    913             .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              01E6    914             .BYTE   READ                    ; command
00              01E7    915             .BYTE   MODIFIER_00
00              01E8    916             .BYTE   UNIT_0
00              01E9    917             .BYTE   SWITCH_00
00              01EA    918             .BYTE   SEQUENCE_L
00              01EB    919             .BYTE   SEQUENCE_H
00              01EC    920             .BYTE   BYTE_COUNT_00           ; low (data)
02              01ED    921             .BYTE   BYTE_COUNT_02           ; high (data)
15              01EE    922             .BYTE   BLOCK_15                ; low
01              01EF    923             .BYTE   BLOCK_01                ; high
19              01F0    924             .BYTE   CHECKSUM_19             ; low
0D              01F1    925             .BYTE   CHECKSUM_0D             ; high
```

```
                01F2   927 B_WRITE_17_CMD:
02              01F2   928          .BYTE   COMMAND_FLAG
0A              01F3   929          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              01F4   930          .BYTE   WRITE                   ; command
00              01F5   931          .BYTE   MODIFIER_00
00              01F6   932          .BYTE   UNIT_0
00              01F7   933          .BYTE   SWITCH_00
00              01F8   934          .BYTE   SEQUENCE_L
00              01F9   935          .BYTE   SEQUENCE_H
F4              01FA   936          .BYTE   BYTE_COUNT_F4           ; low (data)
01              01FB   937          .BYTE   BYTE_COUNT_01           ; high (data)
80              01FC   938          .BYTE   BLOCK_80                ; low
00              01FD   939          .BYTE   BLOCK_00                ; high
79              01FE   940          .BYTE   CHECKSUM_79             ; low
0C              01FF   941          .BYTE   CHECKSUM_0C             ; high
                0200   942
                0200   943
                0200   944 B_READ_15_CMD:
02              0200   945          .BYTE   COMMAND_FLAG
0A              0201   946          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              0202   947          .BYTE   READ                    ; command
00              0203   948          .BYTE   MODIFIER_00
00              0204   949          .BYTE   UNIT_0
00              0205   950          .BYTE   SWITCH_00
00              0206   951          .BYTE   SEQUENCE_L
00              0207   952          .BYTE   SEQUENCE_H
00              0208   953          .BYTE   BYTE_COUNT_00           ; low (data)
02              0209   954          .BYTE   BYTE_COUNT_02           ; high (data)
80              020A   955          .BYTE   BLOCK_80                ; low
00              020B   956          .BYTE   BLOCK_00                ; high
84              020C   957          .BYTE   CHECKSUM_84             ; low
0C              020D   958          .BYTE   CHECKSUM_0C             ; high
                020E   959
                020E   960
                020E   961 B_WRITE_18_CMD:
02              020E   962          .BYTE   COMMAND_FLAG
0A              020F   963          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              0210   964          .BYTE   WRITE                   ; command
80              0211   965          .BYTE   MODIFIER_80
00              0212   966          .BYTE   UNIT_0
00              0213   967          .BYTE   SWITCH_00
00              0214   968          .BYTE   SEQUENCE_L
00              0215   969          .BYTE   SEQUENCE_H
00              0216   970          .BYTE   BYTE_COUNT_00           ; low (data)
01              0217   971          .BYTE   BYTE_COUNT_01           ; high (data)
04              0218   972          .BYTE   BLOCK_04                ; low
02              0219   973          .BYTE   BLOCK_02                ; high
09              021A   974          .BYTE   CHECKSUM_09             ; low
8D              021B   975          .BYTE   CHECKSUM_8D             ; high
```

```
                021C   977 B_READ_16_CMD:
02              021C   978         .BYTE   COMMAND_FLAG
0A              021D   979         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              021E   980         .BYTE   READ                    ; command
80              021F   981         .BYTE   MODIFIER_80
00              0220   982         .BYTE   UNIT_0
00              0221   983         .BYTE   SWITCH_00
00              0222   984         .BYTE   SEQUENCE_L
00              0223   985         .BYTE   SEQUENCE_H
00              0224   986         .BYTE   BYTE_COUNT_00           ; low (data)
01              0225   987         .BYTE   BYTE_COUNT_01           ; high (data)
04              0226   988         .BYTE   BLOCK_04                ; low
02              0227   989         .BYTE   BLOCK_02                ; high
08              0228   990         .BYTE   CHECKSUM_08             ; low
8D              0229   991         .BYTE   CHECKSUM_8D             ; high
                022A   992
                022A   993
                022A   994 B_WRITE_19_CMD:
02              022A   995         .BYTE   COMMAND_FLAG
0A              022B   996         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              022C   997         .BYTE   WRITE                   ; command
80              022D   998         .BYTE   MODIFIER_80
00              022E   999         .BYTE   UNIT_0
00              022F  1000         .BYTE   SWITCH_00
00              0230  1001         .BYTE   SEQUENCE_L
00              0231  1002         .BYTE   SEQUENCE_H
80              0232  1003         .BYTE   BYTE_COUNT_80           ; low (data)
00              0233  1004         .BYTE   BYTE_COUNT_00           ; high (data)
04              0234  1005         .BYTE   BLOCK_04                ; low
06              0235  1006         .BYTE   BLOCK_06                ; high
89              0236  1007         .BYTE   CHECKSUM_89             ; low
90              0237  1008         .BYTE   CHECKSUM_90             ; high
                0238  1009
                0238  1010
                0238  1011 B_READ_17_CMD:
02              0238  1012         .BYTE   COMMAND_FLAG
0A              0239  1013         .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              023A  1014         .BYTE   READ                    ; command
80              023B  1015         .BYTE   MODIFIER_80
00              023C  1016         .BYTE   UNIT_0
00              023D  1017         .BYTE   SWITCH_00
00              023E  1018         .BYTE   SEQUENCE_L
00              023F  1019         .BYTE   SEQUENCE_H
80              0240  1020         .BYTE   BYTE_COUNT_80           ; low (data)
00              0241  1021         .BYTE   BYTE_COUNT_00           ; high (data)
04              0242  1022         .BYTE   BLOCK_04                ; low
06              0243  1023         .BYTE   BLOCK_06                ; high
88              0244  1024         .BYTE   CHECKSUM_88             ; low
90              0245  1025         .BYTE   CHECKSUM_90             ; high
```

```
                0246  1027 B_WRITE_20_CMD:
02              0246  1028          .BYTE   COMMAND_FLAG
0A              0247  1029          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              0248  1030          .BYTE   WRITE                   ; command
80              0249  1031          .BYTE   MODIFIER_80
00              024A  1032          .BYTE   UNIT_0
00              024B  1033          .BYTE   SWITCH_00
00              024C  1034          .BYTE   SEQUENCE_L
00              024D  1035          .BYTE   SEQUENCE_H
80              024E  1036          .BYTE   BYTE_COUNT_80           ; low (data)
00              024F  1037          .BYTE   BYTE_COUNT_00           ; high (data)
06              0250  1038          .BYTE   BLOCK_06                ; low
06              0251  1039          .BYTE   BLOCK_06                ; high
8B              0252  1040          .BYTE   CHECKSUM_8B             ; low
90              0253  1041          .BYTE   CHECKSUM_90             ; high
                0254  1042
                0254  1043
                0254  1044 B_READ_18_CMD:
02              0254  1045          .BYTE   COMMAND_FLAG
0A              0255  1046          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              0256  1047          .BYTE   READ                    ; command
80              0257  1048          .BYTE   MODIFIER_80
00              0258  1049          .BYTE   UNIT_0
00              0259  1050          .BYTE   SWITCH_00
00              025A  1051          .BYTE   SEQUENCE_L
00              025B  1052          .BYTE   SEQUENCE_H
80              025C  1053          .BYTE   BYTE_COUNT_80           ; low (data)
00              025D  1054          .BYTE   BYTE_COUNT_00           ; high (data)
06              025E  1055          .BYTE   BLOCK_06                ; low
06              025F  1056          .BYTE   BLOCK_06                ; high
8A              0260  1057          .BYTE   CHECKSUM_8A             ; low
90              0261  1058          .BYTE   CHECKSUM_90             ; high
                0262  1059
                0262  1060
                0262  1061 B_WRITE_21_CMD:
02              0262  1062          .BYTE   COMMAND_FLAG
0A              0263  1063          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              0264  1064          .BYTE   WRITE                   ; command
80              0265  1065          .BYTE   MODIFIER_80
00              0266  1066          .BYTE   UNIT_0
00              0267  1067          .BYTE   SWITCH_00
00              0268  1068          .BYTE   SEQUENCE_L
00              0269  1069          .BYTE   SEQUENCE_H
64              026A  1070          .BYTE   BYTE_COUNT_64           ; low (data)
00              026B  1071          .BYTE   BYTE_COUNT_00           ; high (data)
05              026C  1072          .BYTE   BLOCK_05                ; low
06              026D  1073          .BYTE   BLOCK_06                ; high
6E              026E  1074          .BYTE   CHECKSUM_6E             ; low
90              026F  1075          .BYTE   CHECKSUM_90             ; high
                0270  1076
```

```
                0270  1078 B_READ_19_CMD:
02              0270  1079          .BYTE   COMMAND_FLAG
0A              0271  1080          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              0272  1081          .BYTE   READ                    ; command
80              0273  1082          .BYTE   MODIFIER_80
00              0274  1083          .BYTE   UNIT_0
00              0275  1084          .BYTE   SWITCH_00
00              0276  1085          .BYTE   SEQUENCE_L
00              0277  1086          .BYTE   SEQUENCE_H
80              0278  1087          .BYTE   BYTE_COUNT_80           ; low (data)
00              0279  1088          .BYTE   BYTE_COUNT_00           ; high (data)
05              027A  1089          .BYTE   BLOCK_05                ; low
06              027B  1090          .BYTE   BLOCK_06                ; high
89              027C  1091          .BYTE   CHECKSUM_89             ; low
90              027D  1092          .BYTE   CHECKSUM_90             ; high
                027E  1093
                027E  1094
                027E  1095 B_WRITE_22_CMD:
02              027E  1096          .BYTE   COMMAND_FLAG
0A              027F  1097          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              0280  1098          .BYTE   WRITE                   ; command
80              0281  1099          .BYTE   MODIFIER_80
00              0282  1100          .BYTE   UNIT_0
00              0283  1101          .BYTE   SWITCH_00
00              0284  1102          .BYTE   SEQUENCE_L
00              0285  1103          .BYTE   SEQUENCE_H
80              0286  1104          .BYTE   BYTE_COUNT_80           ; low (data)
00              0287  1105          .BYTE   BYTE_COUNT_00           ; high (data)
5A              0288  1106          .BYTE   BLOCK_5A                ; low
02              0289  1107          .BYTE   BLOCK_02                ; high
DF              028A  1108          .BYTE   CHECKSUM_DF             ; low
8C              028B  1109          .BYTE   CHECKSUM_8C             ; high
                028C  1110
                028C  1111
                028C  1112 B_READ_20_CMD:
02              028C  1113          .BYTE   COMMAND_FLAG
0A              028D  1114          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              028E  1115          .BYTE   READ                    ; command
80              028F  1116          .BYTE   MODIFIER_80
00              0290  1117          .BYTE   UNIT_0
00              0291  1118          .BYTE   SWITCH_00
00              0292  1119          .BYTE   SEQUENCE_L
00              0293  1120          .BYTE   SEQUENCE_H
80              0294  1121          .BYTE   BYTE_COUNT_80           ; low (data)
00              0295  1122          .BYTE   BYTE_COUNT_00           ; high (data)
5A              0296  1123          .BYTE   BLOCK_5A                ; low
02              0297  1124          .BYTE   BLOCK_02                ; high
DE              0298  1125          .BYTE   CHECKSUM_DE             ; low
8C              0299  1126          .BYTE   CHECKSUM_8C             ; high
```

```
                029A  1128 B_WRITE_23_CMD:
02              029A  1129          .BYTE   COMMAND_FLAG
0A              029B  1130          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              029C  1131          .BYTE   WRITE                   ; command
80              029D  1132          .BYTE   MODIFIER_80
00              029E  1133          .BYTE   UNIT_0
00              029F  1134          .BYTE   SWITCH_00
00              02A0  1135          .BYTE   SEQUENCE_L
00              02A1  1136          .BYTE   SEQUENCE_H
80              02A2  1137          .BYTE   BYTE_COUNT_80           ; low (data)
00              02A3  1138          .BYTE   BYTE_COUNT_00           ; high (data)
5A              02A4  1139          .BYTE   BLOCK_5A                ; low
06              02A5  1140          .BYTE   BLOCK_06                ; high
DF              02A6  1141          .BYTE   CHECKSUM_DF             ; low
90              02A7  1142          .BYTE   CHECKSUM_90             ; high
                02A8  1143
                02A8  1144
                02A8  1145 B_READ_21_CMD:
02              02A8  1146          .BYTE   COMMAND_FLAG
0A              02A9  1147          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              02AA  1148          .BYTE   READ                    ; command
80              02AB  1149          .BYTE   MODIFIER_80
00              02AC  1150          .BYTE   UNIT_0
00              02AD  1151          .BYTE   SWITCH_00
00              02AE  1152          .BYTE   SEQUENCE_L
00              02AF  1153          .BYTE   SEQUENCE_H
80              02B0  1154          .BYTE   BYTE_COUNT_80           ; low (data)
00              02B1  1155          .BYTE   BYTE_COUNT_00           ; high (data)
5A              02B2  1156          .BYTE   BLOCK_5A                ; low
06              02B3  1157          .BYTE   BLOCK_06                ; high
DE              02B4  1158          .BYTE   CHECKSUM_DE             ; low
90              02B5  1159          .BYTE   CHECKSUM_90             ; high
                02B6  1160
                02B6  1161
                02B6  1162 B_WRITE_24_CMD:
02              02B6  1163          .BYTE   COMMAND_FLAG
0A              02B7  1164          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              02B8  1165          .BYTE   WRITE                   ; command
80              02B9  1166          .BYTE   MODIFIER_80
00              02BA  1167          .BYTE   UNIT_0
00              02BB  1168          .BYTE   SWITCH_00
00              02BC  1169          .BYTE   SEQUENCE_L
00              02BD  1170          .BYTE   SEQUENCE_H
64              02BE  1171          .BYTE   BYTE_COUNT_64           ; low (data)
00              02BF  1172          .BYTE   BYTE_COUNT_00           ; high (data)
06              02C0  1173          .BYTE   BLOCK_06                ; low
02              02C1  1174          .BYTE   BLOCK_02                ; high
6F              02C2  1175          .BYTE   CHECKSUM_6F             ; low
8C              02C3  1176          .BYTE   CHECKSUM_8C             ; high
```

```
                02C4  1178 B_READ_22_CMD:
02              02C4  1179          .BYTE   COMMAND_FLAG
0A              02C5  1180          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              02C6  1181          .BYTE   READ                    ; command
80              02C7  1182          .BYTE   MODIFIER_80
C0              02C8  1183          .BYTE   UNIT_0
00              02C9  1184          .BYTE   SWITCH_00
00              02CA  1185          .BYTE   SEQUENCE_L
00              02CB  1186          .BYTE   SEQUENCE_H
80              02CC  1187          .BYTE   BYTE_COUNT_80           ; low (data)
00              02CD  1188          .BYTE   BYTE_COUNT_00           ; high (data)
06              02CE  1189          .BYTE   BLOCK_06                ; low
02              02CF  1190          .BYTE   BLOCK_02                ; high
8A              02D0  1191          .BYTE   CHECKSUM_8A             ; low
8C              02D1  1192          .BYTE   CHECKSUM_8C             ; high
                02D2  1193
                02D2  1194
                02D2  1195 B_READ_23_CMD:
02              02D2  1196          .BYTE   COMMAND_FLAG
0A              02D3  1197          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              02D4  1198          .BYTE   READ                    ; command
00              02D5  1199          .BYTE   MODIFIER_00
00              02D6  1200          .BYTE   UNIT_0
00              02D7  1201          .BYTE   SWITCH_00
00              02D8  1202          .BYTE   SEQUENCE_L
00              02D9  1203          .BYTE   SEQUENCE_H
00              02DA  1204          .BYTE   BYTE_COUNT_00           ; low (data)
02              02DB  1205          .BYTE   BYTE_COUNT_02           ; high (data)
00              02DC  1206          .BYTE   BLOCK_00                ; low
00              02DD  1207          .BYTE   BLOCK_00                ; high
04              02DE  1208          .BYTE   CHECKSUM_04             ; low
0C              02DF  1209          .BYTE   CHECKSUM_0C             ; high
                02E0  1210
                02E0  1211
                02E0  1212
                02E0  1213
                02E0  1214 B_READ_24_CMD:
02              02E0  1215          .BYTE   COMMAND_FLAG
0A              02E1  1216          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              02E2  1217          .BYTE   READ                    ; command
00              02E3  1218          .BYTE   MODIFIER_00
00              02E4  1219          .BYTE   UNIT_0
00              02E5  1220          .BYTE   SWITCH_00
00              02E6  1221          .BYTE   SEQUENCE_L
00              02E7  1222          .BYTE   SEQUENCE_H
00              02E8  1223          .BYTE   BYTE_COUNT_00           ; low (data)
02              02E9  1224          .BYTE   BYTE_COUNT_02           ; high (data)
15              02EA  1225          .BYTE   BLOCK_15                ; low
00              02EB  1226          .BYTE   BLOCK_00                ; high
19              02EC  1227          .BYTE   CHECKSUM_19             ; low
0C              02ED  1228          .BYTE   CHECKSUM_0C             ; high
                02EE  1229
```

```
                02EE  1231 B_POS_1_CMD:
02              02EE  1232          .BYTE   COMMAND_FLAG
0A              02EF  1233          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
05              02F0  1234          .BYTE   POSITION                ; command
00              02F1  1235          .BYTE   MODIFIER_00
00              02F2  1236          .BYTE   UNIT_0
00              02F3  1237          .BYTE   SWITCH_00
00              02F4  1238          .BYTE   SEQUENCE_L
00              02F5  1239          .BYTE   SEQUENCE_H
00              02F6  1240          .BYTE   BYTE_COUNT_00           ; low (data)
00              02F7  1241          .BYTE   BYTE_COUNT_00           ; high (data)
15              02F8  1242          .BYTE   BLOCK_15                ; low
00              02F9  1243          .BYTE   BLOCK_00                ; high
1C              02FA  1244          .BYTE   CHECKSUM_1C             ; low
0A              02FB  1245          .BYTE   CHECKSUM_0A             ; high
                02FC  1246
                02FC  1247 ; commands for MRSP
                02FC  1248
                02FC  1249 MB_INIT_CMD:
02              02FC  1250          .BYTE   COMMAND_FLAG
0A              02FD  1251          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
01              02FE  1252          .BYTE   INITIALIZE              ; command
00              02FF  1253          .BYTE   MODIFIER_00
00              0300  1254          .BYTE   UNIT_0
08              0301  1255          .BYTE   SWITCH_08
00              0302  1256          .BYTE   SEQUENCE_L
00              0303  1257          .BYTE   SEQUENCE_H
00              0304  1258          .BYTE   BYTE_COUNT_00           ; low (data)
00              0305  1259          .BYTE   BYTE_COUNT_00           ; high (data)
00              0306  1260          .BYTE   BLOCK_00                ; low
00              0307  1261          .BYTE   BLOCK_00                ; high
03              0308  1262          .BYTE   CHECKSUM_03             ; low
12              0309  1263          .BYTE   CHECKSUM_12             ; high
                030A  1264
                030A  1265
                030A  1266 MB_NOP_CMD:
02              030A  1267          .BYTE   COMMAND_FLAG
0A              030B  1268          .BYTE   BYTE_COUNT_0A
00              030C  1269          .BYTE   NO_OPERATION            ; command
00              030D  1270          .BYTE   MODIFIER_00
00              030E  1271          .BYTE   UNIT_0
08              030F  1272          .BYTE   SWITCH_08
00              0310  1273          .BYTE   SEQUENCE_L
00              0311  1274          .BYTE   SEQUENCE_H
00              0312  1275          .BYTE   BYTE_COUNT_00           ; low (data)
00              0313  1276          .BYTE   BYTE_COUNT_00           ; high (data)
00              0314  1277          .BYTE   BLOCK_00                ; low
00              0315  1278          .BYTE   BLOCK_00                ; high
02              0316  1279          .BYTE   CHECKSUM_02             ; low
12              0317  1280          .BYTE   CHECKSUM_12             ; high
                0318  1281
                0318  1282
                0318  1283 MB_DIAGNOSE_CMD:
02              0318  1284          .BYTE   COMMAND_FLAG
0A              0319  1285          .BYTE   BYTE_COUNT_0A
```

```
07  031A  1286          .BYTE   DIAGNOSE                ; command
00  031B  1287          .BYTE   MODIFIER_00
00  031C  1288          .BYTE   UNIT_0
08  031D  1289          .BYTE   SWITCH_08
00  031E  1290          .BYTE   SEQUENCE_L
00  031F  1291          .BYTE   SEQUENCE_H
00  0320  1292          .BYTE   BYTE_COUNT_00           ; low (data)
00  0321  1293          .BYTE   BYTE_COUNT_00           ; high (data)
00  0322  1294          .BYTE   BLOCK_00                ; low
00  0323  1295          .BYTE   BLOCK_00                ; high
09  0324  1296          .BYTE   CHECKSUM_09             ; low
12  0325  1297          .BYTE   CHECKSUM_12             ; high
    0326  1298
```

```
                0326  1300 MB_READ_1_CMD:
02              0326  1301          .BYTE   COMMAND_FLAG
0A              0327  1302          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              0328  1303          .BYTE   READ                    ; command
00              0329  1304          .BYTE   MODIFIER_00
00              032A  1305          .BYTE   UNIT_0
08              032B  1306          .BYTE   SWITCH_08
00              032C  1307          .BYTE   SEQUENCE_L
00              032D  1308          .BYTE   SEQUENCE_H
80              032E  1309          .BYTE   BYTE_COUNT_80           ; low (data)
00              032F  1310          .BYTE   BYTE_COUNT_00           ; high (data)
06              0330  1311          .BYTE   BLOCK_06                ; low
00              0331  1312          .BYTE   BLOCK_00                ; high
8A              0332  1313          .BYTE   CHECKSUM_8A             ; low
12              0333  1314          .BYTE   CHECKSUM_12             ; high
                0334  1315
                0334  1316
                0334  1317 MB_WRITE_1_CMD:
02              0334  1318          .BYTE   COMMAND_FLAG
0A              0335  1319          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              0336  1320          .BYTE   WRITE                   ; command
00              0337  1321          .BYTE   MODIFIER_00
00              0338  1322          .BYTE   UNIT_0
08              0339  1323          .BYTE   SWITCH_08
00              033A  1324          .BYTE   SEQUENCE_L
00              033B  1325          .BYTE   SEQUENCE_H
12              033C  1326          .BYTE   BYTE_COUNT_12           ; low (data)
00              033D  1327          .BYTE   BYTE_COUNT_00           ; high (data)
06              033E  1328          .BYTE   BLOCK_06                ; low
00              033F  1329          .BYTE   BLOCK_00                ; high
1D              0340  1330          .BYTE   CHECKSUM_1D             ; low
12              0341  1331          .BYTE   CHECKSUM_12             ; high
                0342  1332
                0342  1333
                0342  1334 MB_WRITE_2_CMD:
02              0342  1335          .BYTE   COMMAND_FLAG
0A              0343  1336          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              0344  1337          .BYTE   WRITE                   ; command
00              0345  1338          .BYTE   MODIFIER_00
00              0346  1339          .BYTE   UNIT_0
08              0347  1340          .BYTE   SWITCH_08
00              0348  1341          .BYTE   SEQUENCE_L
00              0349  1342          .BYTE   SEQUENCE_H
00              034A  1343          .BYTE   BYTE_COUNT_00           ; low (data)
02              034B  1344          .BYTE   BYTE_COUNT_02           ; high (data)
0A              034C  1345          .BYTE   BLOCK_0A                ; low
00              034D  1346          .BYTE   BLOCK_00                ; high
0F              034E  1347          .BYTE   CHECKSUM_0F             ; low
14              034F  1348          .BYTE   CHECKSUM_14             ; high
```

```
                0350  1350 MB_READ_2_CMD:
02              0350  1351          .BYTE   COMMAND_FLAG
0A              0351  1352          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              0352  1353          .BYTE   READ                    ; command
00              0353  1354          .BYTE   MODIFIER_00
00              0354  1355          .BYTE   UNIT_0
08              0355  1356          .BYTE   SWITCH_08
00              0356  1357          .BYTE   SEQUENCE_L
00              0357  1358          .BYTE   SEQUENCE_H
00              0358  1359          .BYTE   BYTE_COUNT_00           ; low (data)
02              0359  1360          .BYTE   BYTE_COUNT_02           ; high (data)
0A              035A  1361          .BYTE   BLOCK_0A                ; low
00              035B  1362          .BYTE   BLOCK_00                ; high
0E              035C  1363          .BYTE   CHECKSUM_0E             ; low
14              035D  1364          .BYTE   CHECKSUM_14             ; high
                035E  1365
                035E  1366
                035E  1367 MB_WRITE_3_CMD:
02              035E  1368          .BYTE   COMMAND_FLAG
0A              035F  1369          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              0360  1370          .BYTE   WRITE                   ; command
80              0361  1371          .BYTE   MODIFIER_80
00              0362  1372          .BYTE   UNIT_0
08              0363  1373          .BYTE   SWITCH_08
00              0364  1374          .BYTE   SEQUENCE_L
00              0365  1375          .BYTE   SEQUENCE_H
80              0366  1376          .BYTE   BYTE_COUNT_80           ; low (data)
00              0367  1377          .BYTE   BYTE_COUNT_00           ; high (data)
0E              0368  1378          .BYTE   BLOCK_0E                ; low
00              0369  1379          .BYTE   BLOCK_00                ; high
93              036A  1380          .BYTE   CHECKSUM_93             ; low
92              036B  1381          .BYTE   CHECKSUM_92             ; high
                036C  1382
                036C  1383
                036C  1384 MB_READ_3_CMD:
02              036C  1385          .BYTE   COMMAND_FLAG
0A              036D  1386          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              036E  1387          .BYTE   READ                    ; command
80              036F  1388          .BYTE   MODIFIER_80
00              0370  1389          .BYTE   UNIT_0
08              0371  1390          .BYTE   SWITCH_08
00              0372  1391          .BYTE   SEQUENCE_L
00              0373  1392          .BYTE   SEQUENCE_H
80              0374  1393          .BYTE   BYTE_COUNT_80           ; low (data)
00              0375  1394          .BYTE   BYTE_COUNT_00           ; high (data)
0E              0376  1395          .BYTE   BLOCK_0E                ; low
00              0377  1396          .BYTE   BLOCK_00                ; high
92              0378  1397          .BYTE   CHECKSUM_92             ; low
92              0379  1398          .BYTE   CHECKSUM_92             ; high
```

```
                037A  1400 MB_WRITE_4_CMD:
02              037A  1401         .BYTE   COMMAND_FLAG
0A              037B  1402         .BYTE   BYTE_COUNT_0A          ; byte count for command packet
03              037C  1403         .BYTE   WRITE                  ; command
01              037D  1404         .BYTE   MODIFIER_01
00              037E  1405         .BYTE   UNIT_0
08              037F  1406         .BYTE   SWITCH_08
00              0380  1407         .BYTE   SEQUENCE_L
00              0381  1408         .BYTE   SEQUENCE_H
00              0382  1409         .BYTE   BYTE_COUNT_00          ; low (data)
02              0383  1410         .BYTE   BYTE_COUNT_02          ; high (data)
0C              0384  1411         .BYTE   BLOCK_0C               ; low
00              0385  1412         .BYTE   BLOCK_00               ; high
11              0386  1413         .BYTE   CHECKSUM_11            ; low
15              0387  1414         .BYTE   CHECKSUM_15            ; high
                0388  1415
                0388  1416
                0388  1417 MB_READ_4_CMD:
02              0388  1418         .BYTE   COMMAND_FLAG
0A              0389  1419         .BYTE   BYTE_COUNT_0A          ; byte count for command packet
02              038A  1420         .BYTE   READ                   ; command
01              038B  1421         .BYTE   MODIFIER_01
00              038C  1422         .BYTE   UNIT_0
08              038D  1423         .BYTE   SWITCH_08
00              038E  1424         .BYTE   SEQUENCE_L
00              038F  1425         .BYTE   SEQUENCE_H
00              0390  1426         .BYTE   BYTE_COUNT_00          ; low (data)
02              0391  1427         .BYTE   BYTE_COUNT_02          ; high (data)
0C              0392  1428         .BYTE   BLOCK_0C               ; low
00              0393  1429         .BYTE   BLOCK_00               ; high
10              0394  1430         .BYTE   CHECKSUM_10            ; low
15              0395  1431         .BYTE   CHECKSUM_15            ; high
                0396  1432
                0396  1433
                0396  1434 MB_WRITE_5_CMD:
02              0396  1435         .BYTE   COMMAND_FLAG
0A              0397  1436         .BYTE   BYTE_COUNT_0A          ; byte count for command packet
03              0398  1437         .BYTE   WRITE                  ; command
00              0399  1438         .BYTE   MODIFIER_00
00              039A  1439         .BYTE   UNIT_0
08              039B  1440         .BYTE   SWITCH_08
00              039C  1441         .BYTE   SEQUENCE_L
00              039D  1442         .BYTE   SEQUENCE_H
00              039E  1443         .BYTE   BYTE_COUNT_00          ; low (data)
02              039F  1444         .BYTE   BYTE_COUNT_02          ; high (data)
0F              03A0  1445         .BYTE   BLOCK_0F               ; low
00              03A1  1446         .BYTE   BLOCK_00               ; high
14              03A2  1447         .BYTE   CHECKSUM_14            ; low
14              03A3  1448         .BYTE   CHECKSUM_14            ; high
                03A4  1449
```

```
                03A4  1451 MB_WRITE_6_CMD:
02              03A4  1452          .BYTE   COMMAND_FLAG
0A              03A5  1453          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              03A6  1454          .BYTE   WRITE                   ; command
00              03A7  1455          .BYTE   MODIFIER_00
00              03A8  1456          .BYTE   UNIT_0
08              03A9  1457          .BYTE   SWITCH_08
00              03AA  1458          .BYTE   SEQUENCE_L
00              03AB  1459          .BYTE   SEQUENCE_H
00              03AC  1460          .BYTE   BYTE_COUNT_00           ; low (data)
02              03AD  1461          .BYTE   BYTE_COUNT_02           ; high (data)
8F              03AE  1462          .BYTE   BLOCK_8F                ; low
00              03AF  1463          .BYTE   BLOCK_00                ; high
94              03B0  1464          .BYTE   CHECKSUM_94             ; low
14              03B1  1465          .BYTE   CHECKSUM_14             ; high
                03B2  1466
                03B2  1467
                03B2  1468 MB_WRITE_7_CMD:
02              03B2  1469          .BYTE   COMMAND_FLAG
0A              03B3  1470          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              03B4  1471          .BYTE   WRITE                   ; command
00              03B5  1472          .BYTE   MODIFIER_00
00              03B6  1473          .BYTE   UNIT_0
08              03B7  1474          .BYTE   SWITCH_08
00              03B8  1475          .BYTE   SEQUENCE_L
00              03B9  1476          .BYTE   SEQUENCE_H
01              03BA  1477          .BYTE   BYTE_COUNT_01           ; low (data)
00              03BB  1478          .BYTE   BYTE_COUNT_00           ; high (data)
0F              03BC  1479          .BYTE   BLOCK_0F                ; low
00              03BD  1480          .BYTE   BLOCK_00                ; high
15              03BE  1481          .BYTE   CHECKSUM_15             ; low
12              03BF  1482          .BYTE   CHECKSUM_12             ; high
                03C0  1483
                03C0  1484
                03C0  1485 MB_READ_5_CMD:
02              03C0  1486          .BYTE   COMMAND_FLAG
0A              03C1  1487          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              03C2  1488          .BYTE   READ                    ; command
00              03C3  1489          .BYTE   MODIFIER_00
00              03C4  1490          .BYTE   UNIT_0
08              03C5  1491          .BYTE   SWITCH_08
00              03C6  1492          .BYTE   SEQUENCE_L
00              03C7  1493          .BYTE   SEQUENCE_H
00              03C8  1494          .BYTE   BYTE_COUNT_00           ; low (data)
02              03C9  1495          .BYTE   BYTE_COUNT_02           ; high (data)
0F              03CA  1496          .BYTE   BLOCK_0F                ; low
00              03CB  1497          .BYTE   BLOCK_00                ; high
13              03CC  1498          .BYTE   CHECKSUM_13             ; low
14              03CD  1499          .BYTE   CHECKSUM_14             ; high
                03CE  1500
```

```
                03CE  1502 MB_READ_6_CMD:
02              03CE  1503          .BYTE   COMMAND_FLAG
0A              03CF  1504          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              03D0  1505          .BYTE   READ                    ; command
00              03D1  1506          .BYTE   MODIFIER_00
00              03D2  1507          .BYTE   UNIT_0
08              03D3  1508          .BYTE   SWITCH_08
00              03D4  1509          .BYTE   SEQUENCE_L
00              03D5  1510          .BYTE   SEQUENCE_H
00              03D6  1511          .BYTE   BYTE_COUNT_00           ; low (data)
02              03D7  1512          .BYTE   BYTE_COUNT_02           ; high (data)
8F              03D8  1513          .BYTE   BLOCK_8F                ; low
00              03D9  1514          .BYTE   BLOCK_00                ; high
93              03DA  1515          .BYTE   CHECKSUM_93             ; low
14              03DB  1516          .BYTE   CHECKSUM_14             ; high
                03DC  1517
                03DC  1518
                03DC  1519 MB_WRITE_8_CMD:
02              03DC  1520          .BYTE   COMMAND_FLAG
0A              03DD  1521          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              03DE  1522          .BYTE   WRITE                   ; command
80              03DF  1523          .BYTE   MODIFIER_80
00              03E0  1524          .BYTE   UNIT_0
08              03E1  1525          .BYTE   SWITCH_08
00              03E2  1526          .BYTE   SEQUENCE_L
00              03E3  1527          .BYTE   SEQUENCE_H
80              03E4  1528          .BYTE   BYTE_COUNT_80           ; low (data)
00              03E5  1529          .BYTE   BYTE_COUNT_00           ; high (data)
0D              03E6  1530          .BYTE   BLOCK_0D                ; low
00              03E7  1531          .BYTE   BLOCK_00                ; high
92              03E8  1532          .BYTE   CHECKSUM_92             ; low
92              03E9  1533          .BYTE   CHECKSUM_92             ; high
                03EA  1534
                03EA  1535
                03EA  1536 MB_WRITE_9_CMD:
02              03EA  1537          .BYTE   COMMAND_FLAG
0A              03EB  1538          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              03EC  1539          .BYTE   WRITE                   ; command
80              03ED  1540          .BYTE   MODIFIER_80
00              03EE  1541          .BYTE   UNIT_0
08              03EF  1542          .BYTE   SWITCH_08
00              03F0  1543          .BYTE   SEQUENCE_L
00              03F1  1544          .BYTE   SEQUENCE_H
80              03F2  1545          .BYTE   BYTE_COUNT_80           ; low (data)
00              03F3  1546          .BYTE   BYTE_COUNT_00           ; high (data)
0D              03F4  1547          .BYTE   BLOCK_0D                ; low
02              03F5  1548          .BYTE   BLOCK_02                ; high
92              03F6  1549          .BYTE   CHECKSUM_92             ; low
94              03F7  1550          .BYTE   CHECKSUM_94             ; high
                03F8  1551
```

```
                03F8  1553 MB_WRITE_10_CMD:
02              03F8  1554          .BYTE   COMMAND_FLAG
0A              03F9  1555          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              03FA  1556          .BYTE   WRITE                   ; command
80              03FB  1557          .BYTE   MODIFIER_80
00              03FC  1558          .BYTE   UNIT_0
08              03FD  1559          .BYTE   SWITCH_08
00              03FE  1560          .BYTE   SEQUENCE_L
00              03FF  1561          .BYTE   SEQUENCE_H
01              0400  1562          .BYTE   BYTE_COUNT_01           ; low (data)
00              0401  1563          .BYTE   BYTE_COUNT_00           ; high (data)
0D              0402  1564          .BYTE   BLOCK_0D                ; low
00              0403  1565          .BYTE   BLOCK_00                ; high
13              0404  1566          .BYTE   CHECKSUM_13             ; low
92              0405  1567          .BYTE   CHECKSUM_92             ; high
                0406  1568
                0406  1569
                0406  1570 MB_READ_7_CMD:
02              0406  1571          .BYTE   COMMAND_FLAG
0A              0407  1572          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              0408  1573          .BYTE   READ                    ; command
80              0409  1574          .BYTE   MODIFIER_80
00              040A  1575          .BYTE   UNIT_0
08              040B  1576          .BYTE   SWITCH_08
00              040C  1577          .BYTE   SEQUENCE_L
00              040D  1578          .BYTE   SEQUENCE_H
80              040E  1579          .BYTE   BYTE_COUNT_80           ; low (data)
00              040F  1580          .BYTE   BYTE_COUNT_00           ; high (data)
0D              0410  1581          .BYTE   BLOCK_0D                ; low
00              0411  1582          .BYTE   BLOCK_00                ; high
91              0412  1583          .BYTE   CHECKSUM_91             ; low
92              0413  1584          .BYTE   CHECKSUM_92             ; high
                0414  1585
                0414  1586
                0414  1587 MB_READ_8_CMD:
02              0414  1588          .BYTE   COMMAND_FLAG
0A              0415  1589          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              0416  1590          .BYTE   READ                    ; command
80              0417  1591          .BYTE   MODIFIER_80
00              0418  1592          .BYTE   UNIT_0
08              0419  1593          .BYTE   SWITCH_08
00              041A  1594          .BYTE   SEQUENCE_L
00              041B  1595          .BYTE   SEQUENCE_H
80              041C  1596          .BYTE   BYTE_COUNT_80           ; low (data)
00              041D  1597          .BYTE   BYTE_COUNT_00           ; high (data)
0D              041E  1598          .BYTE   BLOCK_0D                ; low
02              041F  1599          .BYTE   BLOCK_02                ; high
91              0420  1600          .BYTE   CHECKSUM_91             ; low
94              0421  1601          .BYTE   CHECKSUM_94             ; high
                0422  1602
```

```
                0422  1604 MB_WRITE_11_CMD:
02              0422  1605          .BYTE   COMMAND_FLAG
0A              0423  1606          .BYTE   BYTE_COUNT_0A            ; byte count for command packet
03              0424  1607          .BYTE   WRITE                    ; command
00              0425  1608          .BYTE   MODIFIER_00
00              0426  1609          .BYTE   UNIT_0
08              0427  1610          .BYTE   SWITCH_08
00              0428  1611          .BYTE   SEQUENCE_L
00              0429  1612          .BYTE   SEQUENCE_H
00              042A  1613          .BYTE   BYTE_COUNT_00            ; low (data)
04              042B  1614          .BYTE   BYTE_COUNT_04            ; high (data)
00              042C  1615          .BYTE   BLOCK_00                 ; low
00              042D  1616          .BYTE   BLOCK_00                 ; high
05              042E  1617          .BYTE   CHECKSUM_05              ; low
16              042F  1618          .BYTE   CHECKSUM_16              ; high
                0430  1619
                0430  1620
                0430  1621 MB_READ_9_CMD:
02              0430  1622          .BYTE   COMMAND_FLAG
0A              0431  1623          .BYTE   BYTE_COUNT_0A            ; byte count for command packet
02              0432  1624          .BYTE   READ                     ; command
00              0433  1625          .BYTE   MODIFIER_00
00              0434  1626          .BYTE   UNIT_0
08              0435  1627          .BYTE   SWITCH_08
00              0436  1628          .BYTE   SEQUENCE_L
00              0437  1629          .BYTE   SEQUENCE_H
00              0438  1630          .BYTE   BYTE_COUNT_00            ; low (data)
04              0439  1631          .BYTE   BYTE_COUNT_04            ; high (data)
00              043A  1632          .BYTE   BLOCK_00                 ; low
00              043B  1633          .BYTE   BLOCK_00                 ; high
04              043C  1634          .BYTE   CHECKSUM_04              ; low
16              043D  1635          .BYTE   CHECKSUM_16              ; high
                043E  1636
                043E  1637
                043E  1638 MB_WRITE_12_CMD:
02              043E  1639          .BYTE   COMMAND_FLAG
0A              043F  1640          .BYTE   BYTE_COUNT_0A            ; byte count for command packet
03              0440  1641          .BYTE   WRITE                    ; command
00              0441  1642          .BYTE   MODIFIER_00
00              0442  1643          .BYTE   UNIT_0
08              0443  1644          .BYTE   SWITCH_08
00              0444  1645          .BYTE   SEQUENCE_L
00              0445  1646          .BYTE   SEQUENCE_H
00              0446  1647          .BYTE   BYTE_COUNT_00            ; low (data)
02              0447  1648          .BYTE   BYTE_COUNT_02            ; high (data)
80              0448  1649          .BYTE   BLOCK_80                 ; low
01              0449  1650          .BYTE   BLOCK_01                 ; high
85              044A  1651          .BYTE   CHECKSUM_85              ; low
15              044B  1652          .BYTE   CHECKSUM_15              ; high
                044C  1653
```

```
                044C  1655 MB_READ_10_CMD:
02              044C  1656          .BYTE   COMMAND_FLAG
0A              044D  1657          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              044E  1658          .BYTE   READ                    ; command
00              044F  1659          .BYTE   MODIFIER_00
00              0450  1660          .BYTE   UNIT_0
08              0451  1661          .BYTE   SWITCH_08
00              0452  1662          .BYTE   SEQUENCE_L
00              0453  1663          .BYTE   SEQUENCE_H
00              0454  1664          .BYTE   BYTE_COUNT_00           ; low (data)
02              0455  1665          .BYTE   BYTE_COUNT_02           ; high (data)
80              0456  1666          .BYTE   BLOCK_80                ; low
01              0457  1667          .BYTE   BLOCK_01                ; high
84              0458  1668          .BYTE   CHECKSUM_84             ; low
15              0459  1669          .BYTE   CHECKSUM_15             ; high
                045A  1670
                045A  1671
                045A  1672 MB_WRITE_13_CMD:
02              045A  1673          .BYTE   COMMAND_FLAG
0A              045B  1674          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              045C  1675          .BYTE   WRITE                   ; command
00              045D  1676          .BYTE   MODIFIER_00
00              045E  1677          .BYTE   UNIT_0
08              045F  1678          .BYTE   SWITCH_08
00              0460  1679          .BYTE   SEQUENCE_L
00              0461  1680          .BYTE   SEQUENCE_H
00              0462  1681          .BYTE   BYTE_COUNT_00           ; low (data)
02              0463  1682          .BYTE   BYTE_COUNT_02           ; high (data)
00              0464  1683          .BYTE   BLOCK_00                ; low
01              0465  1684          .BYTE   BLOCK_01                ; high
05              0466  1685          .BYTE   CHECKSUM_05             ; low
15              0467  1686          .BYTE   CHECKSUM_15             ; high
                0468  1687
                0468  1688
                0468  1689 MB_READ_11_CMD:
02              0468  1690          .BYTE   COMMAND_FLAG
0A              0469  1691          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              046A  1692          .BYTE   READ                    ; command
00              046B  1693          .BYTE   MODIFIER_00
00              046C  1694          .BYTE   UNIT_0
08              046D  1695          .BYTE   SWITCH_08
00              046E  1696          .BYTE   SEQUENCE_L
00              046F  1697          .BYTE   SEQUENCE_H
00              0470  1698          .BYTE   BYTE_COUNT_00           ; low (data)
02              0471  1699          .BYTE   BYTE_COUNT_02           ; high (data)
00              0472  1700          .BYTE   BLOCK_00                ; low
01              0473  1701          .BYTE   BLOCK_01                ; high
04              0474  1702          .BYTE   CHECKSUM_04             ; low
15              0475  1703          .BYTE   CHECKSUM_15             ; high
                0476  1704
```

```
                0476  1706 MB_WRITE_14_CMD:
02              0476  1707          .BYTE   COMMAND_FLAG
0A              0477  1708          .BYTE   BYTE_COUNT_0A            ; byte count for command packet
03              0478  1709          .BYTE   WRITE                    ; command
00              0479  1710          .BYTE   MODIFIER_00
00              047A  1711          .BYTE   UNIT_0
08              047B  1712          .BYTE   SWITCH_08
00              047C  1713          .BYTE   SEQUENCE_L
00              047D  1714          .BYTE   SEQUENCE_H
F4              047E  1715          .BYTE   BYTE_COUNT_F4            ; low (data)
01              047F  1716          .BYTE   BYTE_COUNT_01            ; high (data)
01              0480  1717          .BYTE   BLOCK_01                 ; low
01              0481  1718          .BYTE   BLOCK_01                 ; high
FA              0482  1719          .BYTE   CHECKSUM_FA              ; low
14              0483  1720          .BYTE   CHECKSUM_14              ; high
                0484  1721
                0484  1722
                0484  1723 MB_READ_12_CMD:
02              0484  1724          .BYTE   COMMAND_FLAG
0A              0485  1725          .BYTE   BYTE_COUNT_0A            ; byte count for command packet
02              0486  1726          .BYTE   READ                     ; command
00              0487  1727          .BYTE   MODIFIER_00
00              0488  1728          .BYTE   UNIT_0
08              0489  1729          .BYTE   SWITCH_08
00              048A  1730          .BYTE   SEQUENCE_L
00              048B  1731          .BYTE   SEQUENCE_H
00              048C  1732          .BYTE   BYTE_COUNT_00            ; low (data)
02              048D  1733          .BYTE   BYTE_COUNT_02            ; high (data)
01              048E  1734          .BYTE   BLOCK_01                 ; low
01              048F  1735          .BYTE   BLOCK_01                 ; high
05              0490  1736          .BYTE   CHECKSUM_05              ; low
15              0491  1737          .BYTE   CHECKSUM_15              ; high
                0492  1738
                0492  1739
                0492  1740 MB_WRITE_15_CMD:
02              0492  1741          .BYTE   COMMAND_FLAG
0A              0493  1742          .BYTE   BYTE_COUNT_0A            ; byte count for command packet
03              0494  1743          .BYTE   WRITE                    ; command
00              0495  1744          .BYTE   MODIFIER_00
00              0496  1745          .BYTE   UNIT_0
08              0497  1746          .BYTE   SWITCH_08
00              0498  1747          .BYTE   SEQUENCE_L
00              0499  1748          .BYTE   SEQUENCE_H
00              049A  1749          .BYTE   BYTE_COUNT_00            ; low (data)
02              049B  1750          .BYTE   BYTE_COUNT_02            ; high (data)
15              049C  1751          .BYTE   BLOCK_15                 ; low
00              049D  1752          .BYTE   BLOCK_00                 ; high
1A              049E  1753          .BYTE   CHECKSUM_1A              ; low
14              049F  1754          .BYTE   CHECKSUM_14              ; high
                04A0  1755
```

```
                04A0  1757 MB_READ_13_CMD:
02              04A0  1758          .BYTE   COMMAND_FLAG
0A              04A1  1759          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              04A2  1760          .BYTE   READ                    ; command
00              04A3  1761          .BYTE   MODIFIER_00
00              04A4  1762          .BYTE   UNIT_0
08              04A5  1763          .BYTE   SWITCH_08
00              04A6  1764          .BYTE   SEQUENCE_L
00              04A7  1765          .BYTE   SEQUENCE_H
00              04A8  1766          .BYTE   BYTE_COUNT_00           ; low (data)
02              04A9  1767          .BYTE   BYTE_COUNT_02           ; high (data)
15              04AA  1768          .BYTE   BLOCK_15                ; low
00              04AB  1769          .BYTE   BLOCK_00                ; high
19              04AC  1770          .BYTE   CHECKSUM_19             ; low
14              04AD  1771          .BYTE   CHECKSUM_14             ; high
                04AE  1772
                04AE  1773
                04AE  1774 MB_WRITE_16_CMD:
02              04AE  1775          .BYTE   COMMAND_FLAG
0A              04AF  1776          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              04B0  1777          .BYTE   WRITE                   ; command
00              04B1  1778          .BYTE   MODIFIER_00
00              04B2  1779          .BYTE   UNIT_0
08              04B3  1780          .BYTE   SWITCH_08
00              04B4  1781          .BYTE   SEQUENCE_L
00              04B5  1782          .BYTE   SEQUENCE_H
00              04B6  1783          .BYTE   BYTE_COUNT_00           ; low (data)
02              04B7  1784          .BYTE   BYTE_COUNT_02           ; high (data)
15              04B8  1785          .BYTE   BLOCK_15                ; low
01              04B9  1786          .BYTE   BLOCK_01                ; high
1A              04BA  1787          .BYTE   CHECKSUM_1A             ; low
15              04BB  1788          .BYTE   CHECKSUM_15             ; high
                04BC  1789
                04BC  1790
                04BC  1791 MB_READ_14_CMD:
02              04BC  1792          .BYTE   COMMAND_FLAG
0A              04BD  1793          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              04BE  1794          .BYTE   READ                    ; command
00              04BF  1795          .BYTE   MODIFIER_00
00              04C0  1796          .BYTE   UNIT_0
08              04C1  1797          .BYTE   SWITCH_08
00              04C2  1798          .BYTE   SEQUENCE_L
00              04C3  1799          .BYTE   SEQUENCE_H
00              04C4  1800          .BYTE   BYTE_COUNT_00           ; low (data)
02              04C5  1801          .BYTE   BYTE_COUNT_02           ; high (data)
15              04C6  1802          .BYTE   BLOCK_15                ; low
01              04C7  1803          .BYTE   BLOCK_01                ; high
19              04C8  1804          .BYTE   CHECKSUM_19             ; low
15              04C9  1805          .BYTE   CHECKSUM_15             ; high
```

```
                04CA  1807 MB_WRITE_17_CMD:
02              04CA  1808          .BYTE   COMMAND_FLAG
0A              04CB  1809          .BYTE   BYTE_COUNT_0A          ; byte count for command packet
03              04CC  1810          .BYTE   WRITE                  ; command
00              04CD  1811          .BYTE   MODIFIER_00
00              04CE  1812          .BYTE   UNIT_0
08              04CF  1813          .BYTE   SWITCH_08
00              04D0  1814          .BYTE   SEQUENCE_L
00              04D1  1815          .BYTE   SEQUENCE_H
F4              04D2  1816          .BYTE   BYTE_COUNT_F4          ; low (data)
01              04D3  1817          .BYTE   BYTE_COUNT_01          ; high (data)
80              04D4  1818          .BYTE   BLOCK_80               ; low
00              04D5  1819          .BYTE   BLOCK_00               ; high
79              04D6  1820          .BYTE   CHECKSUM_79            ; low
14              04D7  1821          .BYTE   CHECKSUM_14            ; high
                04D8  1822
                04D8  1823
                04D8  1824 MB_READ_15_CMD:
02              04D8  1825          .BYTE   COMMAND_FLAG
0A              04D9  1826          .BYTE   BYTE_COUNT_0A          ; byte count for command packet
02              04DA  1827          .BYTE   READ                   ; command
00              04DB  1828          .BYTE   MODIFIER_00
00              04DC  1829          .BYTE   UNIT_0
08              04DD  1830          .BYTE   SWITCH_08
00              04DE  1831          .BYTE   SEQUENCE_L
00              04DF  1832          .BYTE   SEQUENCE_H
00              04E0  1833          .BYTE   BYTE_COUNT_00          ; low (data)
02              04E1  1834          .BYTE   BYTE_COUNT_02          ; high (data)
80              04E2  1835          .BYTE   BLOCK_80               ; low
00              04E3  1836          .BYTE   BLOCK_00               ; high
84              04E4  1837          .BYTE   CHECKSUM_84            ; low
14              04E5  1838          .BYTE   CHECKSUM_14            ; high
                04E6  1839
                04E6  1840
                04E6  1841 MB_WRITE_18_CMD:
02              04E6  1842          .BYTE   COMMAND_FLAG
0A              04E7  1843          .BYTE   BYTE_COUNT_0A          ; byte count for command packet
03              04E8  1844          .BYTE   WRITE                  ; command
80              04E9  1845          .BYTE   MODIFIER_80
00              04EA  1846          .BYTE   UNIT_0
08              04EB  1847          .BYTE   SWITCH_08
00              04EC  1848          .BYTE   SEQUENCE_L
00              04ED  1849          .BYTE   SEQUENCE_H
00              04EE  1850          .BYTE   BYTE_COUNT_00          ; low (data)
01              04EF  1851          .BYTE   BYTE_COUNT_01          ; high (data)
04              04F0  1852          .BYTE   BLOCK_04               ; low
02              04F1  1853          .BYTE   BLOCK_02               ; high
09              04F2  1854          .BYTE   CHECKSUM_09            ; low
95              04F3  1855          .BYTE   CHECKSUM_95            ; high
```

```
                04F4  1857 MB_READ_16_CMD:
02              04F4  1858          .BYTE   COMMAND_FLAG
0A              04F5  1859          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              04F6  1860          .BYTE   READ                    ; command
80              04F7  1861          .BYTE   MODIFIER_80
00              04F8  1862          .BYTE   UNIT_0
08              04F9  1863          .BYTE   SWITCH_08
00              04FA  1864          .BYTE   SEQUENCE_L
00              04FB  1865          .BYTE   SEQUENCE_H
00              04FC  1866          .BYTE   BYTE_COUNT_00           ; low (data)
01              04FD  1867          .BYTE   BYTE_COUNT_01           ; high (data)
04              04FE  1868          .BYTE   BLOCK_04                ; low
02              04FF  1869          .BYTE   BLOCK_02                ; high
08              0500  1870          .BYTE   CHECKSUM_08             ; low
95              0501  1871          .BYTE   CHECKSUM_95             ; high
                0502  1872
                0502  1873
                0502  1874 MB_WRITE_19_CMD:
02              0502  1875          .BYTE   COMMAND_FLAG
0A              0503  1876          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              0504  1877          .BYTE   WRITE                   ; command
80              0505  1878          .BYTE   MODIFIER_80
00              0506  1879          .BYTE   UNIT_0
08              0507  1880          .BYTE   SWITCH_08
00              0508  1881          .BYTE   SEQUENCE_L
00              0509  1882          .BYTE   SEQUENCE_H
80              050A  1883          .BYTE   BYTE_COUNT_80           ; low (data)
00              050B  1884          .BYTE   BYTE_COUNT_00           ; high (data)
04              050C  1885          .BYTE   BLOCK_04                ; low
06              050D  1886          .BYTE   BLOCK_06                ; high
89              050E  1887          .BYTE   CHECKSUM_89             ; low
98              050F  1888          .BYTE   CHECKSUM_98             ; high
                0510  1889
                0510  1890
                0510  1891 MB_READ_17_CMD:
02              0510  1892          .BYTE   COMMAND_FLAG
0A              0511  1893          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              0512  1894          .BYTE   READ                    ; command
80              0513  1895          .BYTE   MODIFIER_80
00              0514  1896          .BYTE   UNIT_0
08              0515  1897          .BYTE   SWITCH_08
00              0516  1898          .BYTE   SEQUENCE_L
00              0517  1899          .BYTE   SEQUENCE_H
80              0518  1900          .BYTE   BYTE_COUNT_80           ; low (data)
00              0519  1901          .BYTE   BYTE_COUNT_00           ; high (data)
04              051A  1902          .BYTE   BLOCK_04                ; low
06              051B  1903          .BYTE   BLOCK_06                ; high
88              051C  1904          .BYTE   CHECKSUM_88             ; low
98              051D  1905          .BYTE   CHECKSUM_98             ; high
```

```
                051E  1907 MB_WRITE_20_CMD:
02              051E  1908          .BYTE   COMMAND_FLAG
0A              051F  1909          .BYTE   BYTE_COUNT_0A            ; byte count for command packet
03              0520  1910          .BYTE   WRITE                    ; command
80              0521  1911          .BYTE   MODIFIER_80
00              0522  1912          .BYTE   UNIT_0
08              0523  1913          .BYTE   SWITCH_08
00              0524  1914          .BYTE   SEQUENCE_L
00              0525  1915          .BYTE   SEQUENCE_H
80              0526  1916          .BYTE   BYTE_COUNT_80            ; low (data)
00              0527  1917          .BYTE   BYTE_COUNT_00            ; high (data)
06              0528  1918          .BYTE   BLOCK_06                 ; low
06              0529  1919          .BYTE   BLOCK_06                 ; high
8B              052A  1920          .BYTE   CHECKSUM_8B              ; low
98              052B  1921          .BYTE   CHECKSUM_98              ; high
                052C  1922
                052C  1923
                052C  1924 MB_READ_18_CMD:
02              052C  1925          .BYTE   COMMAND_FLAG
0A              052D  1926          .BYTE   BYTE_COUNT_0A            ; byte count for command packet
02              052E  1927          .BYTE   READ                     ; command
80              052F  1928          .BYTE   MODIFIER_80
00              0530  1929          .BYTE   UNIT_0
08              0531  1930          .BYTE   SWITCH_08
00              0532  1931          .BYTE   SEQUENCE_L
00              0533  1932          .BYTE   SEQUENCE_H
80              0534  1933          .BYTE   BYTE_COUNT_80            ; low (data)
00              0535  1934          .BYTE   BYTE_COUNT_00            ; high (data)
06              0536  1935          .BYTE   BLOCK_06                 ; low
06              0537  1936          .BYTE   BLOCK_06                 ; high
8A              0538  1937          .BYTE   CHECKSUM_8A              ; low
98              0539  1938          .BYTE   CHECKSUM_98              ; high
                053A  1939
                053A  1940
                053A  1941 MB_WRITE_21_CMD:
02              053A  1942          .BYTE   COMMAND_FLAG
0A              053B  1943          .BYTE   BYTE_COUNT_0A            ; byte count for command packet
03              053C  1944          .BYTE   WRITE                    ; command
80              053D  1945          .BYTE   MODIFIER_80
00              053E  1946          .BYTE   UNIT_0
08              053F  1947          .BYTE   SWITCH_08
00              0540  1948          .BYTE   SEQUENCE_L
00              0541  1949          .BYTE   SEQUENCE_H
64              0542  1950          .BYTE   BYTE_COUNT_64            ; low (data)
00              0543  1951          .BYTE   BYTE_COUNT_00            ; high (data)
05              0544  1952          .BYTE   BLOCK_05                 ; low
06              0545  1953          .BYTE   BLOCK_06                 ; high
6E              0546  1954          .BYTE   CHECKSUM_6E              ; low
98              0547  1955          .BYTE   CHECKSUM_98              ; high
                0548  1956
```

```
                0548  1958 MB_READ_19_CMD:
02              0548  1959          .BYTE   COMMAND_FLAG
0A              0549  1960          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              054A  1961          .BYTE   READ                    ; command
80              054B  1962          .BYTE   MODIFIER_80
00              054C  1963          .BYTE   UNIT_0
08              054D  1964          .BYTE   SWITCH_08
00              054E  1965          .BYTE   SEQUENCE_L
00              054F  1966          .BYTE   SEQUENCE_H
80              0550  1967          .BYTE   BYTE_COUNT_80           ; low (data)
00              0551  1968          .BYTE   BYTE_COUNT_00           ; high (data)
05              0552  1969          .BYTE   BLOCK_05                ; low
06              0553  1970          .BYTE   BLOCK_06                ; high
89              0554  1971          .BYTE   CHECKSUM_89             ; low
98              0555  1972          .BYTE   CHECKSUM_98             ; high
                0556  1973
                0556  1974
                0556  1975 MB_WRITE_22_CMD:
02              0556  1976          .BYTE   COMMAND_FLAG
0A              0557  1977          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
03              0558  1978          .BYTE   WRITE                   ; command
80              0559  1979          .BYTE   MODIFIER_80
00              055A  1980          .BYTE   UNIT_0
08              055B  1981          .BYTE   SWITCH_08
00              055C  1982          .BYTE   SEQUENCE_L
00              055D  1983          .BYTE   SEQUENCE_H
80              055E  1984          .BYTE   BYTE_COUNT_80           ; low (data)
00              055F  1985          .BYTE   BYTE_COUNT_00           ; high (data)
5A              0560  1986          .BYTE   BLOCK_5A                ; low
02              0561  1987          .BYTE   BLOCK_02                ; high
DF              0562  1988          .BYTE   CHECKSUM_DF             ; low
94              0563  1989          .BYTE   CHECKSUM_94             ; high
                0564  1990
                0564  1991
                0564  1992 MB_READ_20_CMD:
02              0564  1993          .BYTE   COMMAND_FLAG
0A              0565  1994          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              0566  1995          .BYTE   READ                    ; command
80              0567  1996          .BYTE   MODIFIER_80
00              0568  1997          .BYTE   UNIT_0
08              0569  1998          .BYTE   SWITCH_08
00              056A  1999          .BYTE   SEQUENCE_L
00              056B  2000          .BYTE   SEQUENCE_H
80              056C  2001          .BYTE   BYTE_COUNT_80           ; low (data)
00              056D  2002          .BYTE   BYTE_COUNT_00           ; high (data)
5A              056E  2003          .BYTE   BLOCK_5A                ; low
02              056F  2004          .BYTE   BLOCK_02                ; high
DE              0570  2005          .BYTE   CHECKSUM_DE             ; low
94              0571  2006          .BYTE   CHECKSUM_94             ; high
```

```
                0572  2008 MB_WRITE_23_CMD:
02              0572  2009          .BYTE   COMMAND_FLAG
0A              0573  2010          .BYTE   BYTE_COUNT_0A            ; byte count for command packet
03              0574  2011          .BYTE   WRITE                    ; command
80              0575  2012          .BYTE   MODIFIER_80
00              0576  2013          .BYTE   UNIT_0
08              0577  2014          .BYTE   SWITCH_08
00              0578  2015          .BYTE   SEQUENCE_L
00              0579  2016          .BYTE   SEQUENCE_H
80              057A  2017          .BYTE   BYTE_COUNT_80            ; low (data)
00              057B  2018          .BYTE   BYTE_COUNT_00            ; high (data)
5A              057C  2019          .BYTE   BLOCK_5A                 ; low
06              057D  2020          .BYTE   BLOCK_06                 ; high
DF              057E  2021          .BYTE   CHECKSUM_DF              ; low
98              057F  2022          .BYTE   CHECKSUM_98              ; high
                0580  2023
                0580  2024
                0580  2025 MB_READ_21_CMD:
02              0580  2026          .BYTE   COMMAND_FLAG
0A              0581  2027          .BYTE   BYTE_COUNT_0A            ; byte count for command packet
02              0582  2028          .BYTE   READ                     ; command
80              0583  2029          .BYTE   MODIFIER_80
00              0584  2030          .BYTE   UNIT_0
08              0585  2031          .BYTE   SWITCH_08
00              0586  2032          .BYTE   SEQUENCE_L
00              0587  2033          .BYTE   SEQUENCE_H
80              0588  2034          .BYTE   BYTE_COUNT_80            ; low (data)
00              0589  2035          .BYTE   BYTE_COUNT_00            ; high (data)
5A              058A  2036          .BYTE   BLOCK_5A                 ; low
06              058B  2037          .BYTE   BLOCK_06                 ; high
DE              058C  2038          .BYTE   CHECKSUM_DE              ; low
98              058D  2039          .BYTE   CHECKSUM_98              ; high
                058E  2040
                058E  2041
                058E  2042 MB_WRITE_24_CMD:
02              058E  2043          .BYTE   COMMAND_FLAG
0A              058F  2044          .BYTE   BYTE_COUNT_0A            ; byte count for command packet
03              0590  2045          .BYTE   WRITE                    ; command
80              0591  2046          .BYTE   MODIFIER_80
00              0592  2047          .BYTE   UNIT_0
08              0593  2048          .BYTE   SWITCH_08
00              0594  2049          .BYTE   SEQUENCE_L
00              0595  2050          .BYTE   SEQUENCE_H
64              0596  2051          .BYTE   BYTE_COUNT_64            ; low (data)
00              0597  2052          .BYTE   BYTE_COUNT_00            ; high (data)
06              0598  2053          .BYTE   BLOCK_06                 ; low
02              0599  2054          .BYTE   BLOCK_02                 ; high
6F              059A  2055          .BYTE   CHECKSUM_6F              ; low
94              059B  2056          .BYTE   CHECKSUM_94              ; high
```

```
                059C  2058 MB_READ_22_CMD:
02              059C  2059          .BYTE   COMMAND_FLAG
0A              059D  2060          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              059E  2061          .BYTE   READ                    ; command
80              059F  2062          .BYTE   MODIFIER_80
00              05A0  2063          .BYTE   UNIT_0
08              05A1  2064          .BYTE   SWITCH_08
00              05A2  2065          .BYTE   SEQUENCE_L
00              05A3  2066          .BYTE   SEQUENCE_H
80              05A4  2067          .BYTE   BYTE_COUNT_80           ; low (data)
00              05A5  2068          .BYTE   BYTE_COUNT_00           ; high (data)
06              05A6  2069          .BYTE   BLOCK_06                ; low
02              05A7  2070          .BYTE   BLOCK_02                ; high
8A              05A8  2071          .BYTE   CHECKSUM_8A             ; low
94              05A9  2072          .BYTE   CHECKSUM_94             ; high
                05AA  2073
                05AA  2074
                05AA  2075 MB_READ_23_CMD:
02              05AA  2076          .BYTE   COMMAND_FLAG
0A              05AB  2077          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              05AC  2078          .BYTE   READ                    ; command
00              05AD  2079          .BYTE   MODIFIER_00
00              05AE  2080          .BYTE   UNIT_0
08              05AF  2081          .BYTE   SWITCH_08
00              05B0  2082          .BYTE   SEQUENCE_L
00              05B1  2083          .BYTE   SEQUENCE_H
00              05B2  2084          .BYTE   BYTE_COUNT_00           ; low (data)
02              05B3  2085          .BYTE   BYTE_COUNT_02           ; high (data)
00              05B4  2086          .BYTE   BLOCK_00                ; low
00              05B5  2087          .BYTE   BLOCK_00                ; high
04              05B6  2088          .BYTE   CHECKSUM_04             ; low
14              05B7  2089          .BYTE   CHECKSUM_14             ; high
                05B8  2090
                05B8  2091
                05B8  2092
                05B8  2093
                05B8  2094 MB_READ_24_CMD:
02              05B8  2095          .BYTE   COMMAND_FLAG
0A              05B9  2096          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
02              05BA  2097          .BYTE   READ                    ; command
00              05BB  2098          .BYTE   MODIFIER_00
00              05BC  2099          .BYTE   UNIT_0
08              05BD  2100          .BYTE   SWITCH_08
00              05BE  2101          .BYTE   SEQUENCE_L
00              05BF  2102          .BYTE   SEQUENCE_H
00              05C0  2103          .BYTE   BYTE_COUNT_00           ; low (data)
02              05C1  2104          .BYTE   BYTE_COUNT_02           ; high (data)
15              05C2  2105          .BYTE   BLOCK_15                ; low
00              05C3  2106          .BYTE   BLOCK_00                ; high
19              05C4  2107          .BYTE   CHECKSUM_19             ; low
14              05C5  2108          .BYTE   CHECKSUM_14             ; high
                05C6  2109
```

```
                05C6  2111 MB_POS_1_CMD:
02              05C6  2112          .BYTE   COMMAND_FLAG
0A              05C7  2113          .BYTE   BYTE_COUNT_0A           ; byte count for command packet
05              05C8  2114          .BYTE   POSITION                ; command
00              05C9  2115          .BYTE   MODIFIER_00
00              05CA  2116          .BYTE   UNIT_0
08              05CB  2117          .BYTE   SWITCH_08
00              05CC  2118          .BYTE   SEQUENCE_L
00              05CD  2119          .BYTE   SEQUENCE_H
00              05CE  2120          .BYTE   BYTE_COUNT_00           ; low (data)
00              05CF  2121          .BYTE   BYTE_COUNT_00           ; high (data)
15              05D0  2122          .BYTE   BLOCK_15                ; low
00              05D1  2123          .BYTE   BLOCK_00                ; high
1C              05D2  2124          .BYTE   CHECKSUM_1C             ; low
12              05D3  2125          .BYTE   CHECKSUM_12             ; high
                05D4  2126
                05D4  2127
                05D4  2128
                05D4  2129
```

```
                        05D4  2131 .SBTTL  END PACKET TABLE
                        05D4  2132
                        05D4  2133 ; end packets for RSP
                        05D4  2134
                        05D4  2135 B_END_PACKET_1:
                  02    05D4  2136          .BYTE   END_FLAG
                  0A    05D5  2137          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
                  40    05D6  2138          .BYTE   END_CODE                ; op code
                  00    05D7  2139          .BYTE   SUCCESS_CODE
                  00    05D8  2140          .BYTE   UNIT_0
                  00    05D9  2141          .BYTE   NOT_USED
                  00    05DA  2142          .BYTE   SEQUENCE_L
                  00    05DB  2143          .BYTE   SEQUENCE_H
                  00    05DC  2144          .BYTE   BYTE_COUNT_00           ; low (data)
                  00    05DD  2145          .BYTE   BYTE_COUNT_00           ; high (data)
                  00    05DE  2146          .BYTE   SUMMARY_STAT_L
                  00    05DF  2147          .BYTE   SUMMARY_STAT_H
                  42    05E0  2148          .BYTE   CHECKSUM_42             ; low
                  0A    05E1  2149          .BYTE   CHECKSUM_0A             ; high
                        05E2  2150
                        05E2  2151
                        05E2  2152 B_END_PACKET_2:
                  02    05E2  2153          .BYTE   END_FLAG
                  0A    05E3  2154          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
                  40    05E4  2155          .BYTE   END_CODE                ; op code
                  00    05E5  2156          .BYTE   SUCCESS_CODE
                  00    05E6  2157          .BYTE   UNIT_0
                  00    05E7  2158          .BYTE   NOT_USED
                  00    05E8  2159          .BYTE   SEQUENCE_L
                  00    05E9  2160          .BYTE   SEQUENCE_H
                  80    05EA  2161          .BYTE   BYTE_COUNT_80           ; low (data)
                  00    05EB  2162          .BYTE   BYTE_COUNT_00           ; high (data)
                  00    05EC  2163          .BYTE   SUMMARY_STAT_L
                  00    05ED  2164          .BYTE   SUMMARY_STAT_H
                  C2    05EE  2165          .BYTE   CHECKSUM_C2             ; low
                  0A    05EF  2166          .BYTE   CHECKSUM_0A             ; high
                        05F0  2167
                        05F0  2168
                        05F0  2169 B_END_PACKET_3:
                  02    05F0  2170          .BYTE   END_FLAG
                  0A    05F1  2171          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
                  40    05F2  2172          .BYTE   END_CODE                ; op code
                  00    05F3  2173          .BYTE   SUCCESS_CODE
                  00    05F4  2174          .BYTE   UNIT_0
                  00    05F5  2175          .BYTE   NOT_USED
                  00    05F6  2176          .BYTE   SEQUENCE_L
                  00    05F7  2177          .BYTE   SEQUENCE_H
                  1A    05F8  2178          .BYTE   BYTE_COUNT_1A           ; low (data)
                  00    05F9  2179          .BYTE   BYTE_COUNT_00           ; high (data)
                  00    05FA  2180          .BYTE   SUMMARY_STAT_L
                  00    05FB  2181          .BYTE   SUMMARY_STAT_H
                  5C    05FC  2182          .BYTE   CHECKSUM_5C             ; low
                  0A    05FD  2183          .BYTE   CHECKSUM_0A             ; high
                        05FE  2184
```

```
                    05FE  2186 B_END_PACKET_4:
02                  05FE  2187          .BYTE   END_FLAG
0A                  05FF  2188          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40                  0600  2189          .BYTE   END_CODE                ; op code
00                  0601  2190          .BYTE   SUCCESS_CODE
00                  0602  2191          .BYTE   UNIT_0
00                  0603  2192          .BYTE   NOT_USED
00                  0604  2193          .BYTE   SEQUENCE_L
00                  0605  2194          .BYTE   SEQUENCE_H
00                  0606  2195          .BYTE   BYTE_COUNT_00           ; low (data)
02                  0607  2196          .BYTE   BYTE_COUNT_02           ; high (data)
00                  0608  2197          .BYTE   SUMMARY_STAT_L
00                  0609  2198          .BYTE   SUMMARY_STAT_H
42                  060A  2199          .BYTE   CHECKSUM_42             ; low
0C                  060B  2200          .BYTE   CHECKSUM_0C             ; high
                    060C  2201
                    060C  2202
                    060C  2203 B_END_PACKET_5:
02                  060C  2204          .BYTE   END_FLAG
0A                  060D  2205          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40                  060E  2206          .BYTE   END_CODE                ; op code
00                  060F  2207          .BYTE   SUCCESS_CODE
00                  0610  2208          .BYTE   UNIT_0
00                  0611  2209          .BYTE   NOT_USED
00                  0612  2210          .BYTE   SEQUENCE_L
00                  0613  2211          .BYTE   SEQUENCE_H
80                  0614  2212          .BYTE   BYTE_COUNT_80           ; low (data)
00                  0615  2213          .BYTE   BYTE_COUNT_00           ; high (data)
00                  0616  2214          .BYTE   SUMMARY_STAT_L
00                  0617  2215          .BYTE   SUMMARY_STAT_H
C2                  0618  2216          .BYTE   CHECKSUM_C2             ; low
0A                  0619  2217          .BYTE   CHECKSUM_0A             ; high
                    061A  2218
                    061A  2219
                    061A  2220 B_END_PACKET_6:
02                  061A  2221          .BYTE   END_FLAG
0A                  061B  2222          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40                  061C  2223          .BYTE   END_CODE                ; op code
00                  061D  2224          .BYTE   SUCCESS_CODE
00                  061E  2225          .BYTE   UNIT_0
00                  061F  2226          .BYTE   NOT_USED
00                  0620  2227          .BYTE   SEQUENCE_L
00                  0621  2228          .BYTE   SEQUENCE_H
01                  0622  2229          .BYTE   BYTE_COUNT_01           ; low (data)
00                  0623  2230          .BYTE   BYTE_COUNT_00           ; high (data)
00                  0624  2231          .BYTE   SUMMARY_STAT_L
00                  0625  2232          .BYTE   SUMMARY_STAT_H
43                  0626  2233          .BYTE   CHECKSUM_43             ; low
0A                  0627  2234          .BYTE   CHECKSUM_0A             ; high
                    0628  2235
```

```
                0628  2237 B_END_PACKET_7:
02              0628  2238          .BYTE   END_FLAG
0A              0629  2239          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40              062A  2240          .BYTE   END_CODE                ; op code
00              062B  2241          .BYTE   SUCCESS_CODE
00              062C  2242          .BYTE   UNIT_0
00              062D  2243          .BYTE   NOT_USED
00              062E  2244          .BYTE   SEQUENCE_L
00              062F  2245          .BYTE   SEQUENCE_H
00              0630  2246          .BYTE   BYTE_COUNT_00           ; low (data)
04              0631  2247          .BYTE   BYTE_COUNT_04           ; high (data)
00              0632  2248          .BYTE   SUMMARY_STAT_L
00              0633  2249          .BYTE   SUMMARY_STAT_H
42              0634  2250          .BYTE   CHECKSUM_42             ; low
0E              0635  2251          .BYTE   CHECKSUM_0E             ; high
                0636  2252
                0636  2253
                0636  2254 B_END_PACKET_8:
02              0636  2255          .BYTE   END_FLAG
0A              0637  2256          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40              0638  2257          .BYTE   END_CODE                ; op code
00              0639  2258          .BYTE   SUCCESS_CODE
00              063A  2259          .BYTE   UNIT_0
00              063B  2260          .BYTE   NOT_USED
00              063C  2261          .BYTE   SEQUENCE_L
00              063D  2262          .BYTE   SEQUENCE_H
F4              063E  2263          .BYTE   BYTE_COUNT_F4           ; low (data)
01              063F  2264          .BYTE   BYTE_COUNT_01           ; high (data)
00              0640  2265          .BYTE   SUMMARY_STAT_L
00              0641  2266          .BYTE   SUMMARY_STAT_H
36              0642  2267          .BYTE   CHECKSUM_36             ; low
0C              0643  2268          .BYTE   CHECKSUM_0C             ; high
                0644  2269
                0644  2270 B_END_PACKET_9:
02              0644  2271          .BYTE   END_FLAG
0A              0645  2272          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40              0646  2273          .BYTE   END_CODE                ; op code
00              0647  2274          .BYTE   SUCCESS_CODE
00              0648  2275          .BYTE   UNIT_0
00              0649  2276          .BYTE   NOT_USED
00              064A  2277          .BYTE   SEQUENCE_L
00              064B  2278          .BYTE   SEQUENCE_H
00              064C  2279          .BYTE   BYTE_COUNT_00           ; low (data)
01              064D  2280          .BYTE   BYTE_COUNT_01           ; high (data)
00              064E  2281          .BYTE   SUMMARY_STAT_L
00              064F  2282          .BYTE   SUMMARY_STAT_H
42              0650  2283          .BYTE   CHECKSUM_42             ; low
0B              0651  2284          .BYTE   CHECKSUM_0B             ; high
                0652  2285
```

```
                 0652  2287 B_END_PACKET_10:
02               0652  2288          .BYTE   END_FLAG
0A               0653  2289          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40               0654  2290          .BYTE   END_CODE                ; op code
00               0655  2291          .BYTE   SUCCESS_CODE
00               0656  2292          .BYTE   UNIT_0
00               0657  2293          .BYTE   NOT_USED
00               0658  2294          .BYTE   SEQUENCE_L
00               0659  2295          .BYTE   SEQUENCE_H
64               065A  2296          .BYTE   BYTE_COUNT_64           ; low (data)
00               065B  2297          .BYTE   BYTE_COUNT_00           ; high (data)
00               065C  2298          .BYTE   SUMMARY_STAT_L
00               065D  2299          .BYTE   SUMMARY_STAT_H
A6               065E  2300          .BYTE   CHECKSUM_A6             ; low
0A               065F  2301          .BYTE   CHECKSUM_0A             ; high
                 0660  2302
                 0660  2303 ; end packets for MRSP
                 0660  2304
                 0660  2305 MB_END_PACKET_1:
02               0660  2306          .BYTE   END_FLAG
0A               0661  2307          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40               0662  2308          .BYTE   END_CODE                ; op code
00               0663  2309          .BYTE   SUCCESS_CODE
00               0664  2310          .BYTE   UNIT_0
08               0665  2311          .BYTE   SWITCH_08
00               0666  2312          .BYTE   SEQUENCE_L
00               0667  2313          .BYTE   SEQUENCE_H
00               0668  2314          .BYTE   BYTE_COUNT_00           ; low (data)
00               0669  2315          .BYTE   BYTE_COUNT_00           ; high (data)
00               066A  2316          .BYTE   SUMMARY_STAT_L
00               066B  2317          .BYTE   SUMMARY_STAT_H
42               066C  2318          .BYTE   CHECKSUM_42             ; low
12               066D  2319          .BYTE   CHECKSUM_12             ; high
                 066E  2320
                 066E  2321
                 066E  2322 MB_END_PACKET_2:
02               066E  2323          .BYTE   END_FLAG
0A               066F  2324          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40               0670  2325          .BYTE   END_CODE                ; op code
00               0671  2326          .BYTE   SUCCESS_CODE
00               0672  2327          .BYTE   UNIT_0
08               0673  2328          .BYTE   SWITCH_08
00               0674  2329          .BYTE   SEQUENCE_L
00               0675  2330          .BYTE   SEQUENCE_H
80               0676  2331          .BYTE   BYTE_COUNT_80           ; low (data)
00               0677  2332          .BYTE   BYTE_COUNT_00           ; high (data)
00               0678  2333          .BYTE   SUMMARY_STAT_L
00               0679  2334          .BYTE   SUMMARY_STAT_H
C2               067A  2335          .BYTE   CHECKSUM_C2             ; low
12               067B  2336          .BYTE   CHECKSUM_12             ; high
                 067C  2337
                 067C  2338
                 067C  2339 MB_END_PACKET_3:
02               067C  2340          .BYTE   END_FLAG
0A               067D  2341          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
```

```
40  067E  2342          .BYTE   END_CODE                ; op code
00  067F  2343          .BYTE   SUCCESS_CODE
00  0680  2344          .BYTE   UNIT_0
08  0681  2345          .BYTE   SWITCH_08
00  0682  2346          .BYTE   SEQUENCE_L
00  0683  2347          .BYTE   SEQUENCE_H
1A  0684  2348          .BYTE   BYTE_COUNT_1A           ; low (data)
00  0685  2349          .BYTE   BYTE_COUNT_00           ; high (data)
00  0686  2350          .BYTE   SUMMARY_STAT_L
00  0687  2351          .BYTE   SUMMARY_STAT_H
5C  0688  2352          .BYTE   CHECKSUM_5C             ; low
12  0689  2353          .BYTE   CHECKSUM_12             ; high
    068A  2354
```

```
                    068A  2356 MB_END_PACKET_4:
02                  068A  2357          .BYTE   END_FLAG
0A                  068B  2358          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40                  068C  2359          .BYTE   END_CODE                ; op code
00                  068D  2360          .BYTE   SUCCESS_CODE
00                  068E  2361          .BYTE   UNIT_0
08                  068F  2362          .BYTE   SWITCH_08
00                  0690  2363          .BYTE   SEQUENCE_L
00                  0691  2364          .BYTE   SEQUENCE_H
00                  0692  2365          .BYTE   BYTE_COUNT_00           ; low (data)
02                  0693  2366          .BYTE   BYTE_COUNT_02           ; high (data)
00                  0694  2367          .BYTE   SUMMARY_STAT_L
00                  0695  2368          .BYTE   SUMMARY_STAT_H
42                  0696  2369          .BYTE   CHECKSUM_42             ; low
14                  0697  2370          .BYTE   CHECKSUM_14             ; high
                    0698  2371
                    0698  2372
                    0698  2373 MB_END_PACKET_5:
02                  0698  2374          .BYTE   END_FLAG
0A                  0699  2375          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40                  069A  2376          .BYTE   END_CODE                ; op code
00                  069B  2377          .BYTE   SUCCESS_CODE
00                  069C  2378          .BYTE   UNIT_0
08                  069D  2379          .BYTE   SWITCH_08
00                  069E  2380          .BYTE   SEQUENCE_L
00                  069F  2381          .BYTE   SEQUENCE_H
80                  06A0  2382          .BYTE   BYTE_COUNT_80           ; low (data)
00                  06A1  2383          .BYTE   BYTE_COUNT_00           ; high (data)
00                  06A2  2384          .BYTE   SUMMARY_STAT_L
00                  06A3  2385          .BYTE   SUMMARY_STAT_H
C2                  06A4  2386          .BYTE   CHECKSUM_C2             ; low
12                  06A5  2387          .BYTE   CHECKSUM_12             ; high
                    06A6  2388
                    06A6  2389
                    06A6  2390 MB_END_PACKET_6:
02                  06A6  2391          .BYTE   END_FLAG
0A                  06A7  2392          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40                  06A8  2393          .BYTE   END_CODE                ; op code
00                  06A9  2394          .BYTE   SUCCESS_CODE
00                  06AA  2395          .BYTE   UNIT_0
08                  06AB  2396          .BYTE   SWITCH_08
00                  06AC  2397          .BYTE   SEQUENCE_L
00                  06AD  2398          .BYTE   SEQUENCE_H
01                  06AE  2399          .BYTE   BYTE_COUNT_01           ; low (data)
00                  06AF  2400          .BYTE   BYTE_COUNT_00           ; high (data)
00                  06B0  2401          .BYTE   SUMMARY_STAT_L
00                  06B1  2402          .BYTE   SUMMARY_STAT_H
43                  06B2  2403          .BYTE   CHECKSUM_43             ; low
12                  06B3  2404          .BYTE   CHECKSUM_12             ; high
                    06B4  2405
```

```
                06B4  2407 MB_END_PACKET_7:
02              06B4  2408          .BYTE   END_FLAG
0A              06B5  2409          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40              06B6  2410          .BYTE   END_CODE                ; op code
00              06B7  2411          .BYTE   SUCCESS_CODE
00              06B8  2412          .BYTE   UNIT_0
08              06B9  2413          .BYTE   SWITCH_08
00              06BA  2414          .BYTE   SEQUENCE_L
00              06BB  2415          .BYTE   SEQUENCE_H
00              06BC  2416          .BYTE   BYTE_COUNT_00           ; low (data)
04              06BD  2417          .BYTE   BYTE_COUNT_04           ; high (data)
00              06BE  2418          .BYTE   SUMMARY_STAT_L
00              06BF  2419          .BYTE   SUMMARY_STAT_H
42              06C0  2420          .BYTE   CHECKSUM_42             ; low
16              06C1  2421          .BYTE   CHECKSUM_16             ; high
                06C2  2422
                06C2  2423
                06C2  2424 MB_END_PACKET_8:
02              06C2  2425          .BYTE   END_FLAG
0A              06C3  2426          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40              06C4  2427          .BYTE   END_CODE                ; op code
00              06C5  2428          .BYTE   SUCCESS_CODE
00              06C6  2429          .BYTE   UNIT_0
08              06C7  2430          .BYTE   SWITCH_08
00              06C8  2431          .BYTE   SEQUENCE_L
00              06C9  2432          .BYTE   SEQUENCE_H
F4              06CA  2433          .BYTE   BYTE_COUNT_F4           ; low (data)
01              06CB  2434          .BYTE   BYTE_COUNT_01           ; high (data)
00              06CC  2435          .BYTE   SUMMARY_STAT_L
00              06CD  2436          .BYTE   SUMMARY_STAT_H
36              06CE  2437          .BYTE   CHECKSUM_36             ; low
14              06CF  2438          .BYTE   CHECKSUM_14             ; high
                06D0  2439
                06D0  2440 MB_END_PACKET_9:
02              06D0  2441          .BYTE   END_FLAG
0A              06D1  2442          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40              06D2  2443          .BYTE   END_CODE                ; op code
00              06D3  2444          .BYTE   SUCCESS_CODE
00              06D4  2445          .BYTE   UNIT_0
08              06D5  2446          .BYTE   SWITCH_08
00              06D6  2447          .BYTE   SEQUENCE_L
00              06D7  2448          .BYTE   SEQUENCE_H
00              06D8  2449          .BYTE   BYTE_COUNT_00           ; low (data)
01              06D9  2450          .BYTE   BYTE_COUNT_01           ; high (data)
00              06DA  2451          .BYTE   SUMMARY_STAT_L
00              06DB  2452          .BYTE   SUMMARY_STAT_H
42              06DC  2453          .BYTE   CHECKSUM_42             ; low
13              06DD  2454          .BYTE   CHECKSUM_13             ; high
                06DE  2455
```

```
                06DE  2457 MB_END_PACKET_10:
02              06DE  2458          .BYTE   END_FLAG
0A              06DF  2459          .BYTE   BYTE_COUNT_0A           ; byte count for end packet
40              06E0  2460          .BYTE   END_CODE                ; op code
00              06E1  2461          .BYTE   SUCCESS_CODE
00              06E2  2462          .BYTE   UNIT_0
08              06E3  2463          .BYTE   SWITCH_08
00              06E4  2464          .BYTE   SEQUENCE_L
00              06E5  2465          .BYTE   SEQUENCE_H
64              06E6  2466          .BYTE   BYTE_COUNT_64           ; low (data)
00              06E7  2467          .BYTE   BYTE_COUNT_00           ; high (data)
00              06E8  2468          .BYTE   SUMMARY_STAT_L
00              06E9  2469          .BYTE   SUMMARY_STAT_H
A6              06EA  2470          .BYTE   CHECKSUM_A6             ; low
12              06EB  2471          .BYTE   CHECKSUM_12             ; high
                06EC  2472
```

```
                        06EC  2474 .SBTTL  DATA PACKET TABLE
                        06EC  2475
                        06EC  2476 B_DATA_PKT_1:
                  01    06EC  2477          .BYTE   DATA_FLAG
                  1A    06ED  2478          .BYTE   BYTE_COUNT_1A   ; byte count in hex.
                0004    06EE  2479          .WORD   DATA_0004
                0000    06F0  2480          .WORD   DATA_0000       ; this data is used to write
                0001    06F2  2481          .WORD   DATA_0001       ;  one directory area on the
                0000    06F4  2482          .WORD   DATA_0000       ;  tape called "SCRAT.CH"
                000F    06F6  2483          .WORD   DATA_000F
                0400    06F8  2484          .WORD   DATA_0400
                774A    06FA  2485          .WORD   DATA_774A
                0960    06FC  2486          .WORD   DATA_0960
                1400    06FE  2487          .WORD   DATA_1400
                0000    0700  2488          .WORD   DATA_0000
                0000    0702  2489          .WORD   DATA_0000
                0000    0704  2490          .WORD   DATA_0000
                0800    0706  2491          .WORD   DATA_0800
                  BF    0708  2492          .BYTE   CHECKSUM_BF     ; low
                  BA    0709  2493          .BYTE   CHECKSUM_BA     ; high
                        070A  2494
                        070A  2495
                        070A  2496 B_DATA_PKT_2:
                  01    070A  2497          .BYTE   DATA_FLAG
                  80    070B  2498          .BYTE   BYTE_COUNT_80   ; byte count in hex.
00FF'00FF'00FF'00FF'00FF'00FF'00FF'  070C  2499          .WORD   DATA_00FF[^X40] ; data and number of words in hex.
00FF'00FF'00FF'00FF'00FF'00FF'00FF'  071A
00FF'00FF'00FF'00FF'00FF'00FF'00FF'  0728
00FF'00FF'00FF'00FF'00FF'00FF'00FF'  0736
00FF'00FF'00FF'00FF'00FF'00FF'00FF'  0744
00FF'00FF'00FF'00FF'00FF'00FF'00FF'  0752
00FF'00FF'00FF'00FF'00FF'00FF'00FF'  0760
00FF'00FF'00FF'00FF'00FF'00FF'00FF'  076E
00FF'00FF'00FF'00FF'00FF'00FF'00FF'  077C
                00FF'  078A
                  C1    078C  2500          .BYTE   CHECKSUM_C1     ; low
                  BF    078D  2501          .BYTE   CHECKSUM_BF     ; high
                        078E  2502
                        078E  2503
                        078E  2504 B_DATA_PKT_3:
                  01    078E  2505          .BYTE   DATA_FLAG
                  80    078F  2506          .BYTE   BYTE_COUNT_80   ; byte count in hex.
FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'  0790  2507          .WORD   DATA_FFFF[^X40] ; data and number of words in hex.
FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'  079E
FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'  07AC
FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'  07BA
FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'  07C8
FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'  07D6
FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'  07E4
FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'  07F2
FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'FFFF'  0800
                FFFF'  080E
                  01    0810  2508          .BYTE   CHECKSUM_01     ; low
                  80    0811  2509          .BYTE   CHECKSUM_80     ; high
                        0812  2510
```

```
                                  0812  2511
                                  0812  2512 B_DATA_PKT_4:
                              01  0812  2513          .BYTE   DATA_FLAG
                              01  0813  2514          .BYTE   BYTE_COUNT_01    ; byte count in hex.
                              AA  0814  2515          .BYTE   DATA_00AA        ; data and number of words in hex.
                              AB  0815  2516          .BYTE   CHECKSUM_AB      ; low
                              01  0816  2517          .BYTE   CHECKSUM_01      ; high
                                  0817  2518
                                  0817  2519
                                  0817  2520 B_DATA_PKT_5:
                              01  0817  2521          .BYTE   DATA_FLAG
                              80  0818  2522          .BYTE   BYTE_COUNT_80    ; byte count in hex.
                            00AA  0819  2523          .WORD   DATA_00AA
 0000'0000'0000'0000'0000'0000'0000' 081B  2524          .WORD   DATA_0000[^X3F] ; data and number of words in hex.
 0000'0000'0000'0000'0000'0000'0000' 0829
 0000'0000'0000'0000'0000'0000'0000' 0837
 0000'0000'0000'0000'0000'0000'0000' 0845
 0000'0000'0000'0000'0000'0000'0000' 0853
 0000'0000'0000'0000'0000'0000'0000' 0861
 0000'0000'0000'0000'0000'0000'0000' 086F
 0000'0000'0000'0000'0000'0000'0000' 087D
 0000'0000'0000'0000'0000'0000'0000' 088B
                              AB  0899  2525          .BYTE   CHECKSUM_AB      ; low
                              80  089A  2526          .BYTE   CHECKSUM_80      ; high
```

```
                                    089B  2528 B_DATA_PKT_6:
                                 01 089B  2529          .BYTE   DATA_FLAG
                                 80 089C  2530          .BYTE   BYTE_COUNT_80    ; byte count in hex.
0000'0000'0000'0000'0000'0000'0000' 089D  2531          .WORD   DATA_0000[^X40] ; data and number of words in hex.
0000'0000'0000'0000'0000'0000'0000' 08AB
0000'0000'0000'0000'0000'0000'0000' 08B9
0000'0000'0000'0000'0000'0000'0000' 08C7
0000'0000'0000'0000'0000'0000'0000' 08D5
0000'0000'0000'0000'0000'0000'0000' 08E3
0000'0000'0000'0000'0000'0000'0000' 08F1
0000'0000'0000'0000'0000'0000'0000' 08FF
0000'0000'0000'0000'0000'0000'0000' 090D
                               0000' 091B
                                 01 091D  2532          .BYTE   CHECKSUM_01      ; low
                                 80 091E  2533          .BYTE   CHECKSUM_80      ; high
                                    091F  2534
                                    091F  2535
                                    091F  2536 B_DATA_PKT_7:
                                 01 091F  2537          .BYTE   DATA_FLAG
                                 80 0920  2538          .BYTE   BYTE_COUNT_80    ; byte count in hex.
0001'0001'0001'0001'0001'0001'0001' 0921  2539          .WORD   DATA_0001[^X40] ; data and number of words in hex.
0001'0001'0001'0001'0001'0001'0001' 092F
0001'0001'0001'0001'0001'0001'0001' 093D
0001'0001'0001'0001'0001'0001'0001' 094B
0001'0001'0001'0001'0001'0001'0001' 0959
0001'0001'0001'0001'0001'0001'0001' 0967
0001'0001'0001'0001'0001'0001'0001' 0975
0001'0001'0001'0001'0001'0001'0001' 0983
0001'0001'0001'0001'0001'0001'0001' 0991
                               0001' 099F
                                 41 09A1  2540          .BYTE   CHECKSUM_41      ; low
                                 80 09A2  2541          .BYTE   CHECKSUM_80      ; high
                                    09A3  2542
                                    09A3  2543
                                    09A3  2544 B_DATA_PKT_8:
                                 01 09A3  2545          .BYTE   DATA_FLAG
                                 80 09A4  2546          .BYTE   BYTE_COUNT_80    ; byte count in hex.
0180'0180'0180'0180'0180'0180'0180' 09A5  2547          .WORD   DATA_0180[^X40] ; data and number of words in hex.
0180'0180'0180'0180'0180'0180'0180' 09B3
0180'0180'0180'0180'0180'0180'0180' 09C1
0180'0180'0180'0180'0180'0180'0180' 09CF
0180'0180'0180'0180'0180'0180'0180' 09DD
0180'0180'0180'0180'0180'0180'0180' 09EB
0180'0180'0180'0180'0180'0180'0180' 09F9
0180'0180'0180'0180'0180'0180'0180' 0A07
0180'0180'0180'0180'0180'0180'0180' 0A15
                               0180' 0A23
                                 01 0A25  2548          .BYTE   CHECKSUM_01      ; low
                                 E0 0A26  2549          .BYTE   CHECKSUM_E0      ; high
                                    0A27  2550
                                    0A27  2551
                                    0A27  2552 B_DATA_PKT_9:
                                 01 0A27  2553          .BYTE   DATA_FLAG
                                 80 0A28  2554          .BYTE   BYTE_COUNT_80    ; byte count in hex.
0100'0100'0100'0100'0100'0100'0100' 0A29  2555          .WORD   DATA_0100[^X40] ; data and number of words in hex.
```

```
0100'0100'0100'0100'0100'0100'0100' 0A37
0100'0100'0100'0100'0100'0100'0100' 0A45
0100'0100'0100'0100'0100'0100'0100' 0A53
0100'0100'0100'0100'0100'0100'0100' 0A61
0100'0100'0100'0100'0100'0100'0100' 0A6F
0100'0100'0100'0100'0100'0100'0100' 0A7D
0100'0100'0100'0100'0100'0100'0100' 0A8B
0100'0100'0100'0100'0100'0100'0100' 0A99
                          0100' 0AA7
                            01  0AA9  2556          .BYTE   CHECKSUM_01      ; low
                            C0  0AAA  2557          .BYTE   CHECKSUM_C0      ; high
                                0AAB  2558
                                0AAB  2559
                                0AAB  2560 B_DATA_PKT_10:
                            01  0AAB  2561          .BYTE   DATA_FLAG
                            80  0AAC  2562          .BYTE   BYTE_COUNT_80    ; byte count in hex.
0101'0101'0101'0101'0101'0101'0101' 0AAD  2563          .WORD   DATA_0101[^X40] ; data and number of words in hex.
0101'0101'0101'0101'0101'0101'0101' 0ABB
0101'0101'0101'0101'0101'0101'0101' 0AC9
0101'0101'0101'0101'0101'0101'0101' 0AD7
0101'0101'0101'0101'0101'0101'0101' 0AE5
0101'0101'0101'0101'0101'0101'0101' 0AF3
0101'0101'0101'0101'0101'0101'0101' 0B01
0101'0101'0101'0101'0101'0101'0101' 0B0F
0101'0101'0101'0101'0101'0101'0101' 0B1D
                          0101' 0B2B
                            41  0B2D  2564          .BYTE   CHECKSUM_41      ; low
                            C0  0B2E  2565          .BYTE   CHECKSUM_C0      ; high
                                0B2F  2566
                                0B2F  2567
                                0B2F  2568 B_DATA_PKT_11:
                            01  0B2F  2569          .BYTE   DATA_FLAG
                            74  0B30  2570          .BYTE   BYTE_COUNT_74    ; byte count in hex.
0101'0101'0101'0101'0101'0101'0101' 0B31  2571          .WORD   DATA_0101[^X3A] ; data and number of words in hex.
0101'0101'0101'0101'0101'0101'0101' 0B3F
0101'0101'0101'0101'0101'0101'0101' 0B4D
0101'0101'0101'0101'0101'0101'0101' 0B5B
0101'0101'0101'0101'0101'0101'0101' 0B69
0101'0101'0101'0101'0101'0101'0101' 0B77
0101'0101'0101'0101'0101'0101'0101' 0B85
0101'0101'0101'0101'0101'0101'0101' 0B93
                    0101'0101' 0BA1
                            75  0BA5  2572          .BYTE   CHECKSUM_75      ; low
                            E8  0BA6  2573          .BYTE   CHECKSUM_E8      ; high
                                0BA7  2574
```

```
                                  0BA7  2576 B_DATA_PKT_12:
                                01  0BA7  2577          .BYTE   DATA_FLAG
                                80  0BA8  2578          .BYTE   BYTE_COUNT_80    ; byte count in hex.
0101'0101'0101'0101'0101'0101'0101' 0BA9  2579          .WORD   DATA_0101[^X3A] ; data and number of words in hex.
0101'0101'0101'0101'0101'0101'0101' 0BB7
0101'0101'0101'0101'0101'0101'0101' 0BC5
0101'0101'0101'0101'0101'0101'0101' 0BD3
0101'0101'0101'0101'0101'0101'0101' 0BE1
0101'0101'0101'0101'0101'0101'0101' 0BEF
0101'0101'0101'0101'0101'0101'0101' 0BFD
0101'0101'0101'0101'0101'0101'0101' 0C0B
                          0101'0101' 0C19
     0000'0000'0000'0000'0000'0000' 0C1D  2580          .WORD   DATA_0000[^X06]
                                75  0C29  2581          .BYTE   CHECKSUM_75      ; low
                                F4  0C2A  2582          .BYTE   CHECKSUM_F4      ; high
                                    0C2B  2583
                                    0C2B  2584
                                    0C2B  2585 B_DATA_PKT_13:
                                01  0C2B  2586          .BYTE   DATA_FLAG
                                80  0C2C  2587          .BYTE   BYTE_COUNT_80    ; byte count in hex.
0015'0015'0015'0015'0015'0015'0015' 0C2D  2588          .WORD   DATA_0015[^X40] ; data and number of words in hex.
0015'0015'0015'0015'0015'0015'0015' 0C3B
0015'0015'0015'0015'0015'0015'0015' 0C49
0015'0015'0015'0015'0015'0015'0015' 0C57
0015'0015'0015'0015'0015'0015'0015' 0C65
0015'0015'0015'0015'0015'0015'0015' 0C73
0015'0015'0015'0015'0015'0015'0015' 0C81
0015'0015'0015'0015'0015'0015'0015' 0C8F
0015'0015'0015'0015'0015'0015'0015' 0C9D
                          0015'     0CAB
                            41  0CAD  2589          .BYTE   CHECKSUM_41      ; low
                            85  0CAE  2590          .BYTE   CHECKSUM_85      ; high
                                0CAF  2591
                                0CAF  2592
                                0CAF  2593 B_DATA_PKT_14:
                                01  0CAF  2594          .BYTE   DATA_FLAG
                                80  0CB0  2595          .BYTE   BYTE_COUNT_80    ; byte count in hex.
0115'0115'0115'0115'0115'0115'0115' 0CB1  2596          .WORD   DATA_0115[^X40] ; data and number of words in hex.
0115'0115'0115'0115'0115'0115'0115' 0CBF
0115'0115'0115'0115'0115'0115'0115' 0CCD
0115'0115'0115'0115'0115'0115'0115' 0CDB
0115'0115'0115'0115'0115'0115'0115' 0CE9
0115'0115'0115'0115'0115'0115'0115' 0CF7
0115'0115'0115'0115'0115'0115'0115' 0D05
0115'0115'0115'0115'0115'0115'0115' 0D13
0115'0115'0115'0115'0115'0115'0115' 0D21
                          0115'     0D2F
                            41  0D31  2597          .BYTE   CHECKSUM_41      ; low
                            C5  0D32  2598          .BYTE   CHECKSUM_C5      ; high
                                0D33  2599
                                0D33  2600
                                0D33  2601 B_DATA_PKT_15:
                                01  0D33  2602          .BYTE   DATA_FLAG
                                80  0D34  2603          .BYTE   BYTE_COUNT_80    ; byte count in hex.
0080'0080'0080'0080'0080'0080'0080' 0D35  2604          .WORD   DATA_0080[^X40] ; data and number of words in hex.
```

```
 0080'0080'0080'0080'0080'0080'0080'  0D43
 0080'0080'0080'0080'0080'0080'0080'  0D51
 0080'0080'0080'0080'0080'0080'0080'  0D5F
 0080'0080'0080'0080'0080'0080'0080'  0D6D
 0080'0080'0080'0080'0080'0080'0080'  0D7B
 0080'0080'0080'0080'0080'0080'0080'  0D89
 0080'0080'0080'0080'0080'0080'0080'  0D97
 0080'0080'0080'0080'0080'0080'0080'  0DA5
                          0080'  0DB3
                            01   0DB5  2605          .BYTE   CHECKSUM_01      ; low
                            AE   0DB6  2606          .BYTE   CHECKSUM_AE      ; high
                                 0DB7  2607
                                 0DB7  2608
                                 0DB7  2609 B_DATA_PKT_16:
                            01   0DB7  2610          .BYTE   DATA_FLAG
                            74   0DB8  2611          .BYTE   BYTE_COUNT_74    ; byte count in hex.
 0080'0080'0080'0080'0080'0080'0080'  0DB9  2612          .WORD   DATA_0080[^X3A] ; data and number of words in hex.
 0080'0080'0080'0080'0080'0080'0080'  0DC7
 0080'0080'0080'0080'0080'0080'0080'  0DD5
 0080'0080'0080'0080'0080'0080'0080'  0DE3
 0080'0080'0080'0080'0080'0080'0080'  0DF1
 0080'0080'0080'0080'0080'0080'0080'  0DFF
 0080'0080'0080'0080'0080'0080'0080'  0E0D
 0080'0080'0080'0080'0080'0080'0080'  0E1B
                     0080'0080'  0E29
      0000'0000'0000'0000'0000'0000'  0E2D  2613          .WORD   DATA_0000[^X06]
                            01   0E39  2614          .BYTE   CHECKSUM_01      ; low
                            AE   0E3A  2615          .BYTE   CHECKSUM_AE      ; high
                                 0E3B  2616
                                 0E3B  2617
                                 0E3B  2618 B_DATA_PKT_17:
                            01   0E3B  2619          .BYTE   DATA_FLAG
                            80   0E3C  2620          .BYTE   BYTE_COUNT_80    ; byte count in hex.
 0080'0080'0080'0080'0080'0080'0080'  0E3D  2621          .WORD   DATA_0080[^X3A] ; data and number of words in hex.
 0080'0080'0080'0080'0080'0080'0080'  0E4B
 0080'0080'0080'0080'0080'0080'0080'  0E59
 0080'0080'0080'0080'0080'0080'0080'  0E67
 0080'0080'0080'0080'0080'0080'0080'  0E75
 0080'0080'0080'0080'0080'0080'0080'  0E83
 0080'0080'0080'0080'0080'0080'0080'  0E91
 0080'0080'0080'0080'0080'0080'0080'  0E9F
                     0080'0080'  0EAD
      0000'0000'0000'0000'0000'0000'  0EB1  2622          .WORD   DATA_0000[^X06]
                            01   0EBD  2623          .BYTE   CHECKSUM_01      ; low
                            BA   0EBE  2624          .BYTE   CHECKSUM_BA      ; high
                                 0EBF  2625
```

```
                                0EBF  2627 B_DATA_PKT_18:
                             01 0EBF  2628          .BYTE   DATA_FLAG
                             80 0EC0  2629          .BYTE   BYTE_COUNT_80    ; byte count in hex.
0204'0204'0204'0204'0204'0204'0204' 0EC1  2630          .WORD   DATA_0204[^X40] ; data and number of words in hex.
0204'0204'0204'0204'0204'0204'0204' 0ECF
0204'0204'0204'0204'0204'0204'0204' 0EDD
0204'0204'0204'0204'0204'0204'0204' 0EEB
0204'0204'0204'0204'0204'0204'0204' 0EF9
0204'0204'0204'0204'0204'0204'0204' 0F07
0204'0204'0204'0204'0204'0204'0204' 0F15
0204'0204'0204'0204'0204'0204'0204' 0F23
0204'0204'0204'0204'0204'0204'0204' 0F31
                           0204' 0F3F
                             02 0F41  2631          .BYTE   CHECKSUM_02      ; low
                             01 0F42  2632          .BYTE   CHECKSUM_01      ; high
                                0F43  2633
                                0F43  2634
                                0F43  2635 B_DATA_PKT_19:
                             01 0F43  2636          .BYTE   DATA_FLAG
                             80 0F44  2637          .BYTE   BYTE_COUNT_80    ; byte count in hex.
0604'0604'0604'0604'0604'0604'0604' 0F45  2638          .WORD   DATA_0604[^X40] ; data and number of words in hex.
0604'0604'0604'0604'0604'0604'0604' 0F53
0604'0604'0604'0604'0604'0604'0604' 0F61
0604'0604'0604'0604'0604'0604'0604' 0F6F
0604'0604'0604'0604'0604'0604'0604' 0F7D
0604'0604'0604'0604'0604'0604'0604' 0F8B
0604'0604'0604'0604'0604'0604'0604' 0F99
0604'0604'0604'0604'0604'0604'0604' 0FA7
0604'0604'0604'0604'0604'0604'0604' 0FB5
                           0604' 0FC3
                             03 0FC5  2639          .BYTE   CHECKSUM_03      ; low
                             01 0FC6  2640          .BYTE   CHECKSUM_01      ; high
                                0FC7  2641
                                0FC7  2642
                                0FC7  2643 B_DATA_PKT_20:
                             01 0FC7  2644          .BYTE   DATA_FLAG
                             80 0FC8  2645          .BYTE   BYTE_COUNT_80    ; byte count in hex.
0606'0606'0606'0606'0606'0606'0606' 0FC9  2646          .WORD   DATA_0606[^X40] ; data and number of words in hex.
0606'0606'0606'0606'0606'0606'0606' 0FD7
0606'0606'0606'0606'0606'0606'0606' 0FE5
0606'0606'0606'0606'0606'0606'0606' 0FF3
0606'0606'0606'0606'0606'0606'0606' 1001
0606'0606'0606'0606'0606'0606'0606' 100F
0606'0606'0606'0606'0606'0606'0606' 101D
0606'0606'0606'0606'0606'0606'0606' 102B
0606'0606'0606'0606'0606'0606'0606' 1039
                           0606' 1047
                             83 1049  2647          .BYTE   CHECKSUM_83      ; low
                             01 104A  2648          .BYTE   CHECKSUM_01      ; high
                                104B  2649
                                104B  2650
                                104B  2651 B_DATA_PKT_21:
                             01 104B  2652          .BYTE   DATA_FLAG
                             64 104C  2653          .BYTE   BYTE_COUNT_64    ; byte count in hex.
0605'0605'0605'0605'0605'0605'0605' 104D  2654          .WORD   DATA_0605[^X32] ; data and number of words in hex.
```

```
0605'0605'0605'0605'0605'0605'0605' 105B
0605'0605'0605'0605'0605'0605'0605' 1069
0605'0605'0605'0605'0605'0605'0605' 1077
0605'0605'0605'0605'0605'0605'0605' 1085
0605'0605'0605'0605'0605'0605'0605' 1093
0605'0605'0605'0605'0605'0605'0605' 10A1
                          0605' 10AF
                            FC  10B1  2655          .BYTE   CHECKSUM_FC     ; low
                            72  10B2  2656          .BYTE   CHECKSUM_72     ; high
                                10B3  2657
                                10B3  2658
                                10B3  2659 B_DATA_PKT_22:
                            01  10B3  2660          .BYTE   DATA_FLAG
                            80  10B4  2661          .BYTE   BYTE_COUNT_80   ; byte count in hex.
0605'0605'0605'0605'0605'0605'0605' 10B5  2662          .WORD   DATA_0605[^X40] ; data and number of words in hex.
0605'0605'0605'0605'0605'0605'0605' 10C3
0605'0605'0605'0605'0605'0605'0605' 10D1
0605'0605'0605'0605'0605'0605'0605' 10DF
0605'0605'0605'0605'0605'0605'0605' 10ED
0605'0605'0605'0605'0605'0605'0605' 10FB
0605'0605'0605'0605'0605'0605'0605' 1109
0605'0605'0605'0605'0605'0605'0605' 1117
0605'0605'0605'0605'0605'0605'0605' 1125
                          0605' 1133
                            F7  1135  2663          .BYTE   CHECKSUM_F7     ; low
                            11  1136  2664          .BYTE   CHECKSUM_11     ; high
                                1137  2665
                                1137  2666
                                1137  2667 B_DATA_PKT_23:
                            01  1137  2668          .BYTE   DATA_FLAG
                            80  1138  2669          .BYTE   BYTE_COUNT_80   ; byte count in hex.
025A'025A'025A'025A'025A'025A'025A' 1139  2670          .WORD   DATA_025A[^X40] ; data and number of words in hex.
025A'025A'025A'025A'025A'025A'025A' 1147
025A'025A'025A'025A'025A'025A'025A' 1155
025A'025A'025A'025A'025A'025A'025A' 1163
025A'025A'025A'025A'025A'025A'025A' 1171
025A'025A'025A'025A'025A'025A'025A' 117F
025A'025A'025A'025A'025A'025A'025A' 118D
025A'025A'025A'025A'025A'025A'025A' 119B
025A'025A'025A'025A'025A'025A'025A' 11A9
                          025A' 11B7
                            82  11B9  2671          .BYTE   CHECKSUM_82     ; low
                            16  11BA  2672          .BYTE   CHECKSUM_16     ; high
                                11BB  2673
```

```
                                 11BB  2675 B_DATA_PKT_24:
                              01 11BB  2676          .BYTE   DATA_FLAG
                              80 11BC  2677          .BYTE   BYTE_COUNT_80   ; byte count in hex.
065A'065A'065A'065A'065A'065A'065A' 11BD  2678          .WORD   DATA_065A[^X40] ; data and number of words in hex.
065A'065A'065A'065A'065A'065A'065A' 11CB
065A'065A'065A'065A'065A'065A'065A' 11D9
065A'065A'065A'065A'065A'065A'065A' 11E7
065A'065A'065A'065A'065A'065A'065A' 11F5
065A'065A'065A'065A'065A'065A'065A' 1203
065A'065A'065A'065A'065A'065A'065A' 1211
065A'065A'065A'065A'065A'065A'065A' 121F
065A'065A'065A'065A'065A'065A'065A' 122D
                            065A' 123B
                              83  123D  2679          .BYTE   CHECKSUM_83     ; low
                              16  123E  2680          .BYTE   CHECKSUM_16     ; high
                                  123F  2681
                                  123F  2682
                                  123F  2683 B_DATA_PKT_25:
                              01  123F  2684          .BYTE   DATA_FLAG
                              64  1240  2685          .BYTE   BYTE_COUNT_64   ; byte count in hex.
0206'0206'0206'0206'0206'0206'0206' 1241  2686          .WORD   DATA_0206[^X32] ; data and number of words in hex.
0206'0206'0206'0206'0206'0206'0206' 124F
0206'0206'0206'0206'0206'0206'0206' 125D
0206'0206'0206'0206'0206'0206'0206' 126B
0206'0206'0206'0206'0206'0206'0206' 1279
0206'0206'0206'0206'0206'0206'0206' 1287
0206'0206'0206'0206'0206'0206'0206' 1295
                            0206' 12A3
                              2D  12A5  2687          .BYTE   CHECKSUM_2D     ; low
                              C9  12A6  2688          .BYTE   CHECKSUM_C9     ; high
                                  12A7  2689
                                  12A7  2690
                                  12A7  2691 B_DATA_PKT_26:
                              01  12A7  2692          .BYTE   DATA_FLAG
                              80  12A8  2693          .BYTE   BYTE_COUNT_80   ; byte count in hex.
0206'0206'0206'0206'0206'0206'0206' 12A9  2694          .WORD   DATA_0206[^X32] ; data and number of words in hex.
0206'0206'0206'0206'0206'0206'0206' 12B7
0206'0206'0206'0206'0206'0206'0206' 12C5
0206'0206'0206'0206'0206'0206'0206' 12D3
0206'0206'0206'0206'0206'0206'0206' 12E1
0206'0206'0206'0206'0206'0206'0206' 12EF
0206'0206'0206'0206'0206'0206'0206' 12FD
                            0206' 130B
0000'0000'0000'0000'0000'0000'0000' 130D  2695          .WORD   DATA_0000[^X0E]
0000'0000'0000'0000'0000'0000'0000' 131B
                              2D  1329  2696          .BYTE   CHECKSUM_2D     ; low
                              E5  132A  2697          .BYTE   CHECKSUM_E5     ; high
```

```
                     132B  2699 .SBTTL  COMMAND TABLES
                     132B  2700
                     132B  2701 ; commands for RSP
                     132B  2702
                     132B  2703 ; This is the list of command, end and data packets for the "write block
                     132B  2704 ; padded zeros" subtest. This table lists the addresses that point to
                     132B  2705 ; the actual packet that is needed.
                     132B  2706
000000BE'            132B  2707 COMMAND_TBL_1:  .ADDRESS        B_WRITE_5_CMD
0000078E'            132F  2708                 .ADDRESS        B_DATA_PKT_3
0000078E'            1333  2709                 .ADDRESS        B_DATA_PKT_3
0000078E'            1337  2710                 .ADDRESS        B_DATA_PKT_3
0000078E'            133B  2711                 .ADDRESS        B_DATA_PKT_3
000005FE'            133F  2712                 .ADDRESS        B_END_PACKET_4
                     1343  2713
000000CC'            1343  2714                 .ADDRESS        B_WRITE_6_CMD
0000078E'            1347  2715                 .ADDRESS        B_DATA_PKT_3
0000078E'            134B  2716                 .ADDRESS        B_DATA_PKT_3
0000078E'            134F  2717                 .ADDRESS        B_DATA_PKT_3
0000078E'            1353  2718                 .ADDRESS        B_DATA_PKT_3
000005FE'            1357  2719                 .ADDRESS        B_END_PACKET_4
                     135B  2720
000000DA'            135B  2721                 .ADDRESS        B_WRITE_7_CMD
00000812'            135F  2722                 .ADDRESS        B_DATA_PKT_4
0000061A'            1363  2723                 .ADDRESS        B_END_PACKET_6
                     1367  2724
000000E8'            1367  2725                 .ADDRESS        B_READ_5_CMD
00000817'            136B  2726                 .ADDRESS        B_DATA_PKT_5
0000089B'            136F  2727                 .ADDRESS        B_DATA_PKT_6
0000089B'            1373  2728                 .ADDRESS        B_DATA_PKT_6
0000089B'            1377  2729                 .ADDRESS        B_DATA_PKT_6
000005FE'            137B  2730                 .ADDRESS        B_END_PACKET_4
                     137F  2731
000000F6'            137F  2732                 .ADDRESS        B_READ_6_CMD
0000078E'            1383  2733                 .ADDRESS        B_DATA_PKT_3
0000078E'            1387  2734                 .ADDRESS        B_DATA_PKT_3
0000078E'            138B  2735                 .ADDRESS        B_DATA_PKT_3
0000078E'            138F  2736                 .ADDRESS        B_DATA_PKT_3
000005FE'            1393  2737                 .ADDRESS        B_END_PACKET_4
                     1397  2738
                     1397  2739 ; This is the packet list for the "write record padded zeros" subtest.
                     1397  2740
00000104'            1397  2741 COMMAND_TBL_2:  .ADDRESS        B_WRITE_8_CMD
0000078E'            139B  2742                 .ADDRESS        B_DATA_PKT_3
0000060C'            139F  2743                 .ADDRESS        B_END_PACKET_5
                     13A3  2744
00000112'            13A3  2745                 .ADDRESS        B_WRITE_9_CMD
0000078E'            13A7  2746                 .ADDRESS        B_DATA_PKT_3
0000060C'            13AB  2747                 .ADDRESS        B_END_PACKET_5
                     13AF  2748
00000120'            13AF  2749                 .ADDRESS        B_WRITE_10_CMD
00000812'            13B3  2750                 .ADDRESS        B_DATA_PKT_4
0000061A'            13B7  2751                 .ADDRESS        B_END_PACKET_6
                     13BB  2752
0000012E'            13BB  2753                 .ADDRESS        B_READ_7_CMD
```

```
00000817' 13BF  2754                    .ADDRESS        B_DATA_PKT_5
0000060C' 13C3  2755                    .ADDRESS        B_END_PACKET_5
          13C7  2756
0000013C' 13C7  2757                    .ADDRESS        B_READ_8_CMD
0000078E' 13CB  2758                    .ADDRESS        B_DATA_PKT_3
0000060C' 13CF  2759                    .ADDRESS        B_END_PACKET_5
          13D3  2760
          13D3  2761 ; This is the packet list for the "block write read" subtest.
          13D3  2762
0000014A' 13D3  2763 COMMAND_TBL_3:     .ADDRESS        B_WRITE_11_CMD
0000089B' 13D7  2764                    .ADDRESS        B_DATA_PKT_6
0000089B' 13DB  2765                    .ADDRESS        B_DATA_PKT_6
0000089B' 13DF  2766                    .ADDRESS        B_DATA_PKT_6
0000089B' 13E3  2767                    .ADDRESS        B_DATA_PKT_6
0000091F' 13E7  2768                    .ADDRESS        B_DATA_PKT_7
0000091F' 13EB  2769                    .ADDRESS        B_DATA_PKT_7
0000091F' 13EF  2770                    .ADDRESS        B_DATA_PKT_7
0000091F' 13F3  2771                    .ADDRESS        B_DATA_PKT_7
00000628' 13F7  2772                    .ADDRESS        B_END_PACKET_7
          13FB  2773
00000158' 13FB  2774                    .ADDRESS        B_READ_9_CMD
0000089B' 13FF  2775                    .ADDRESS        B_DATA_PKT_6
0000089B' 1403  2776                    .ADDRESS        B_DATA_PKT_6
0000089B' 1407  2777                    .ADDRESS        B_DATA_PKT_6
0000089B' 140B  2778                    .ADDRESS        B_DATA_PKT_6
0000091F' 140F  2779                    .ADDRESS        B_DATA_PKT_7
0000091F' 1413  2780                    .ADDRESS        B_DATA_PKT_7
0000091F' 1417  2781                    .ADDRESS        B_DATA_PKT_7
0000091F' 141B  2782                    .ADDRESS        B_DATA_PKT_7
00000628' 141F  2783                    .ADDRESS        B_END_PACKET_7
          1423  2784
00000166' 1423  2785                    .ADDRESS        B_WRITE_12_CMD
000009A3' 1427  2786                    .ADDRESS        B_DATA_PKT_8
000009A3' 142B  2787                    .ADDRESS        B_DATA_PKT_8
000009A3' 142F  2788                    .ADDRESS        B_DATA_PKT_8
000009A3' 1433  2789                    .ADDRESS        B_DATA_PKT_8
000005FE' 1437  2790                    .ADDRESS        B_END_PACKET_4
          143B  2791
00000174' 143B  2792                    .ADDRESS        B_READ_10_CMD
000009A3' 143F  2793                    .ADDRESS        B_DATA_PKT_8
000009A3' 1443  2794                    .ADDRESS        B_DATA_PKT_8
000009A3' 1447  2795                    .ADDRESS        B_DATA_PKT_8
000009A3' 144B  2796                    .ADDRESS        B_DATA_PKT_8
000005FE' 144F  2797                    .ADDRESS        B_END_PACKET_4
          1453  2798
00000182' 1453  2799                    .ADDRESS        B_WRITE_13_CMD
00000A27' 1457  2800                    .ADDRESS        B_DATA_PKT_9
00000A27' 145B  2801                    .ADDRESS        B_DATA_PKT_9
00000A27' 145F  2802                    .ADDRESS        B_DATA_PKT_9
00000A27' 1463  2803                    .ADDRESS        B_DATA_PKT_9
000005FE' 1467  2804                    .ADDRESS        B_END_PACKET_4
          146B  2805
00000190' 146B  2806                    .ADDRESS        B_READ_11_CMD
00000A27' 146F  2807                    .ADDRESS        B_DATA_PKT_9
00000A27' 1473  2808                    .ADDRESS        B_DATA_PKT_9
```

```
00000A27' 1477  2809                    .ADDRESS        B_DATA_PKT_9
00000A27' 147B  2810                    .ADDRESS        B_DATA_PKT_9
000005FE' 147F  2811                    .ADDRESS        B_END_PACKET_4
          1483  2812
000001BA' 1483  2813                    .ADDRESS        B_WRITE_15_CMD
00000C2B' 1487  2814                    .ADDRESS        B_DATA_PKT_13
00000C2B' 148B  2815                    .ADDRESS        B_DATA_PKT_13
00000C2B' 148F  2816                    .ADDRESS        B_DATA_PKT_13
00000C2B' 1493  2817                    .ADDRESS        B_DATA_PKT_13
000005FE' 1497  2818                    .ADDRESS        B_END_PACKET_4
          149B  2819
000001C8' 149B  2820                    .ADDRESS        B_READ_13_CMD
00000C2B' 149F  2821                    .ADDRESS        B_DATA_PKT_13
00000C2B' 14A3  2822                    .ADDRESS        B_DATA_PKT_13
00000C2B' 14A7  2823                    .ADDRESS        B_DATA_PKT_13
00000C2B' 14AB  2824                    .ADDRESS        B_DATA_PKT_13
000005FE' 14AF  2825                    .ADDRESS        B_END_PACKET_4
          14B3  2826
000001D6' 14B3  2827                    .ADDRESS        B_WRITE_16_CMD
00000CAF' 14B7  2828                    .ADDRESS        B_DATA_PKT_14
00000CAF' 14BB  2829                    .ADDRESS        B_DATA_PKT_14
00000CAF' 14BF  2830                    .ADDRESS        B_DATA_PKT_14
00000CAF' 14C3  2831                    .ADDRESS        B_DATA_PKT_14
000005FE' 14C7  2832                    .ADDRESS        B_END_PACKET_4
          14CB  2833
000001E4' 14CB  2834                    .ADDRESS        B_READ_14_CMD
00000CAF' 14CF  2835                    .ADDRESS        B_DATA_PKT_14
00000CAF' 14D3  2836                    .ADDRESS        B_DATA_PKT_14
00000CAF' 14D7  2837                    .ADDRESS        B_DATA_PKT_14
00000CAF' 14DB  2838                    .ADDRESS        B_DATA_PKT_14
000005FE' 14DF  2839                    .ADDRESS        B_END_PACKET_4
          14E3  2840
          14E3  2841 ; This is the packet list for the "record write read" subtest
          14E3  2842
0000020E' 14E3  2843 COMMAND_TBL_4:     .ADDRESS        B_WRITE_18_CMD
00000EBF' 14E7  2844                    .ADDRESS        B_DATA_PKT_18
00000EBF' 14EB  2845                    .ADDRESS        B_DATA_PKT_18
00000644' 14EF  2846                    .ADDRESS        B_END_PACKET_9
          14F3  2847
0000021C' 14F3  2848                    .ADDRESS        B_READ_16_CMD
00000EBF' 14F7  2849                    .ADDRESS        B_DATA_PKT_18
00000EBF' 14FB  2850                    .ADDRESS        B_DATA_PKT_18
00000644' 14FF  2851                    .ADDRESS        B_END_PACKET_9
          1503  2852
0000022A' 1503  2853                    .ADDRESS        B_WRITE_19_CMD
00000F43' 1507  2854                    .ADDRESS        B_DATA_PKT_19
0000060C' 150B  2855                    .ADDRESS        B_END_PACKET_5
          150F  2856
00000238' 150F  2857                    .ADDRESS        B_READ_17_CMD
00000F43' 1513  2858                    .ADDRESS        B_DATA_PKT_19
0000060C' 1517  2859                    .ADDRESS        B_END_PACKET_5
          151B  2860
00000246' 151B  2861                    .ADDRESS        B_WRITE_20_CMD
00000FC7' 151F  2862                    .ADDRESS        B_DATA_PKT_20
0000060C' 1523  2863                    .ADDRESS        B_END_PACKET_5
```

```
                     1527  2864
00000254'            1527  2865                    .ADDRESS        B_READ_18_CMD
00000FC7'            152B  2866                    .ADDRESS        B_DATA_PKT_20
0000060C'            152F  2867                    .ADDRESS        B_END_PACKET_5
                     1533  2868
0000027E'            1533  2869                    .ADDRESS        B_WRITE_22_CMD
00001137'            1537  2870                    .ADDRESS        B_DATA_PKT_23
0000060C'            153B  2871                    .ADDRESS        B_END_PACKET_5
                     153F  2872
0000028C'            153F  2873                    .ADDRESS        B_READ_20_CMD
00001137'            1543  2874                    .ADDRESS        B_DATA_PKT_23
0000060C'            1547  2875                    .ADDRESS        B_END_PACKET_5
                     154B  2876
0000029A'            154B  2877                    .ADDRESS        B_WRITE_23_CMD
000011BB'            154F  2878                    .ADDRESS        B_DATA_PKT_24
0000060C'            1553  2879                    .ADDRESS        B_END_PACKET_5
                     1557  2880
000002A8'            1557  2881                    .ADDRESS        B_READ_21_CMD
000011BB'            155B  2882                    .ADDRESS        B_DATA_PKT_24
0000060C'            155F  2883                    .ADDRESS        B_END_PACKET_5
                     1563  2884
                     1563  2885
000002D2'            1563  2886 COMMAND_TBL_5:     .ADDRESS        B_READ_23_CMD
0000089B'            1567  2887                    .ADDRESS        B_DATA_PKT_6
0000089B'            156B  2888                    .ADDRESS        B_DATA_PKT_6
0000089B'            156F  2889                    .ADDRESS        B_DATA_PKT_6
0000089B'            1573  2890                    .ADDRESS        B_DATA_PKT_6
000005FE'            1577  2891                    .ADDRESS        B_END_PACKET_4
                     157B  2892
000002E0'            157B  2893                    .ADDRESS        B_READ_24_CMD
00000C2B'            157F  2894                    .ADDRESS        B_DATA_PKT_13
00000C2B'            1583  2895                    .ADDRESS        B_DATA_PKT_13
00000C2B'            1587  2896                    .ADDRESS        B_DATA_PKT_13
00000C2B'            158B  2897                    .ADDRESS        B_DATA_PKT_13
000005FE'            158F  2898                    .ADDRESS        B_END_PACKET_4
                     1593  2899
000002EE'            1593  2900                    .ADDRESS        B_POS_1_CMD
000005D4'            1597  2901                    .ADDRESS        B_END_PACKET_1
                     159B  2902
000002D2'            159B  2903                    .ADDRESS        B_READ_23_CMD
0000089B'            159F  2904                    .ADDRESS        B_DATA_PKT_6
0000089B'            15A3  2905                    .ADDRESS        B_DATA_PKT_6
0000089B'            15A7  2906                    .ADDRESS        B_DATA_PKT_6
0000089B'            15AB  2907                    .ADDRESS        B_DATA_PKT_6
000005FE'            15AF  2908                    .ADDRESS        B_END_PACKET_4
                     15B3  2909
                     15B3  2910
                     15B3  2911 ; commands for MRSP
                     15B3  2912
                     15B3  2913
                     15B3  2914 ; This is the list of command, end and data packets for the "write block
                     15B3  2915 ; padded zeros" subtest. This table lists the addresses that point to
                     15B3  2916 ; the actual packet that is needed.
                     15B3  2917
00000396'            15B3  2918 MCOMMAND_TBL_1: .ADDRESS        MB_WRITE_5_CMD
```

```
0000078E' 15B7  2919                    .ADDRESS        B_DATA_PKT_3
0000078E' 15BB  2920                    .ADDRESS        B_DATA_PKT_3
0000078E' 15BF  2921                    .ADDRESS        B_DATA_PKT_3
0000078E' 15C3  2922                    .ADDRESS        B_DATA_PKT_3
0000068A' 15C7  2923                    .ADDRESS        MB_END_PACKET_4
          15CB  2924
000003A4' 15CB  2925                    .ADDRESS        MB_WRITE_6_CMD
0000078E' 15CF  2926                    .ADDRESS        B_DATA_PKT_3
0000078E' 15D3  2927                    .ADDRESS        B_DATA_PKT_3
0000078E' 15D7  2928                    .ADDRESS        B_DATA_PKT_3
0000078E' 15DB  2929                    .ADDRESS        B_DATA_PKT_3
0000068A' 15DF  2930                    .ADDRESS        MB_END_PACKET_4
          15E3  2931
000003B2' 15E3  2932                    .ADDRESS        MB_WRITE_7_CMD
00000812' 15E7  2933                    .ADDRESS        B_DATA_PKT_4
000006A6' 15EB  2934                    .ADDRESS        MB_END_PACKET_6
          15EF  2935
000003C0' 15EF  2936                    .ADDRESS        MB_READ_5_CMD
00000817' 15F3  2937                    .ADDRESS        B_DATA_PKT_5
0000089B' 15F7  2938                    .ADDRESS        B_DATA_PKT_6
0000089B' 15FB  2939                    .ADDRESS        B_DATA_PKT_6
0000089B' 15FF  2940                    .ADDRESS        B_DATA_PKT_6
0000068A' 1603  2941                    .ADDRESS        MB_END_PACKET_4
          1607  2942
000003CE' 1607  2943                    .ADDRESS        MB_READ_6_CMD
0000078E' 160B  2944                    .ADDRESS        B_DATA_PKT_3
0000078E' 160F  2945                    .ADDRESS        B_DATA_PKT_3
0000078E' 1613  2946                    .ADDRESS        B_DATA_PKT_3
0000078E' 1617  2947                    .ADDRESS        B_DATA_PKT_3
0000068A' 161B  2948                    .ADDRESS        MB_END_PACKET_4
          161F  2949
          161F  2950 ; This is the packet list for the "write record padded zeros" subtest.
          161F  2951
000003DC' 161F  2952 MCOMMAND_TBL_2:    .ADDRESS        MB_WRITE_8_CMD
0000078E' 1623  2953                    .ADDRESS        B_DATA_PKT_3
00000698' 1627  2954                    .ADDRESS        MB_END_PACKET_5
          162B  2955
000003EA' 162B  2956                    .ADDRESS        MB_WRITE_9_CMD
0000078E' 162F  2957                    .ADDRESS        B_DATA_PKT_3
00000698' 1633  2958                    .ADDRESS        MB_END_PACKET_5
          1637  2959
000003F8' 1637  2960                    .ADDRESS        MB_WRITE_10_CMD
00000812' 163B  2961                    .ADDRESS        B_DATA_PKT_4
000006A6' 163F  2962                    .ADDRESS        MB_END_PACKET_6
          1643  2963
00000406' 1643  2964                    .ADDRESS        MB_READ_7_CMD
00000817' 1647  2965                    .ADDRESS        B_DATA_PKT_5
00000698' 164B  2966                    .ADDRESS        MB_END_PACKET_5
          164F  2967
00000414' 164F  2968                    .ADDRESS        MB_READ_8_CMD
0000078E' 1653  2969                    .ADDRESS        B_DATA_PKT_3
00000698' 1657  2970                    .ADDRESS        MB_END_PACKET_5
          165B  2971
          165B  2972 ; This is the packet list for the "block write read" subtest.
          165B  2973
```

```
                00000422' 165B  2974 MCOMMAND_TBL_3: .ADDRESS       MB_WRITE_11_CMD
                0000089B' 165F  2975                 .ADDRESS       B_DATA_PKT_6
                0000089B' 1663  2976                 .ADDRESS       B_DATA_PKT_6
                0000089B' 1667  2977                 .ADDRESS       B_DATA_PKT_6
                0000089B' 166B  2978                 .ADDRESS       B_DATA_PKT_6
                0000091F' 166F  2979                 .ADDRESS       B_DATA_PKT_7
                0000091F' 1673  2980                 .ADDRESS       B_DATA_PKT_7
                0000091F' 1677  2981                 .ADDRESS       B_DATA_PKT_7
                0000091F' 167B  2982                 .ADDRESS       B_DATA_PKT_7
                000006B4' 167F  2983                 .ADDRESS       MB_END_PACKET_7
                          1683  2984
                00000430' 1683  2985                 .ADDRESS       MB_READ_9_CMD
                0000089B' 1687  2986                 .ADDRESS       B_DATA_PKT_6
                0000089B' 168B  2987                 .ADDRESS       B_DATA_PKT_6
                0000089B' 168F  2988                 .ADDRESS       B_DATA_PKT_6
                0000089B' 1693  2989                 .ADDRESS       B_DATA_PKT_6
                0000091F' 1697  2990                 .ADDRESS       B_DATA_PKT_7
                0000091F' 169B  2991                 .ADDRESS       B_DATA_PKT_7
                0000091F' 169F  2992                 .ADDRESS       B_DATA_PKT_7
                0000091F' 16A3  2993                 .ADDRESS       B_DATA_PKT_7
                000006B4' 16A7  2994                 .ADDRESS       MB_END_PACKET_7
                          16AB  2995
                0000043E' 16AB  2996                 .ADDRESS       MB_WRITE_12_CMD
                000009A3' 16AF  2997                 .ADDRESS       B_DATA_PKT_8
                000009A3' 16B3  2998                 .ADDRESS       B_DATA_PKT_8
                000009A3' 16B7  2999                 .ADDRESS       B_DATA_PKT_8
                000009A3' 16BB  3000                 .ADDRESS       B_DATA_PKT_8
                0000068A' 16BF  3001                 .ADDRESS       MB_END_PACKET_4
                          16C3  3002
                0000044C' 16C3  3003                 .ADDRESS       MB_READ_10_CMD
                000009A3' 16C7  3004                 .ADDRESS       B_DATA_PKT_8
                000009A3' 16CB  3005                 .ADDRESS       B_DATA_PKT_8
                000009A3' 16CF  3006                 .ADDRESS       B_DATA_PKT_8
                000009A3' 16D3  3007                 .ADDRESS       B_DATA_PKT_8
                0000068A' 16D7  3008                 .ADDRESS       MB_END_PACKET_4
                          16DB  3009
                0000045A' 16DB  3010                 .ADDRESS       MB_WRITE_13_CMD
                00000A27' 16DF  3011                 .ADDRESS       B_DATA_PKT_9
                00000A27' 16E3  3012                 .ADDRESS       B_DATA_PKT_9
                00000A27' 16E7  3013                 .ADDRESS       B_DATA_PKT_9
                00000A27' 16EB  3014                 .ADDRESS       B_DATA_PKT_9
                0000068A' 16EF  3015                 .ADDRESS       MB_END_PACKET_4
                          16F3  3016
                00000468' 16F3  3017                 .ADDRESS       MB_READ_11_CMD
                00000A27' 16F7  3018                 .ADDRESS       B_DATA_PKT_9
                00000A27' 16FB  3019                 .ADDRESS       B_DATA_PKT_9
                00000A27' 16FF  3020                 .ADDRESS       B_DATA_PKT_9
                00000A27' 1703  3021                 .ADDRESS       B_DATA_PKT_9
                0000068A' 1707  3022                 .ADDRESS       MB_END_PACKET_4
                          170B  3023
                00000492' 170B  3024                 .ADDRESS       MB_WRITE_15_CMD
                00000C2B' 170F  3025                 .ADDRESS       B_DATA_PKT_13
                00000C2B' 1713  3026                 .ADDRESS       B_DATA_PKT_13
                00000C2B' 1717  3027                 .ADDRESS       B_DATA_PKT_13
                00000C2B' 171B  3028                 .ADDRESS       B_DATA_PKT_13
```

```
0000068A' 171F  3029                    .ADDRESS        MB_END_PACKET_4
          1723  3030
000004A0' 1723  3031                    .ADDRESS        MB_READ_13_CMD
00000C2B' 1727  3032                    .ADDRESS        B_DATA_PKT_13
00000C2B' 172B  3033                    .ADDRESS        B_DATA_PKT_13
00000C2B' 172F  3034                    .ADDRESS        B_DATA_PKT_13
00000C2B' 1733  3035                    .ADDRESS        B_DATA_PKT_13
0000068A' 1737  3036                    .ADDRESS        MB_END_PACKET_4
          173B  3037
000004AE' 173B  3038                    .ADDRESS        MB_WRITE_16_CMD
00000CAF' 173F  3039                    .ADDRESS        B_DATA_PKT_14
00000CAF' 1743  3040                    .ADDRESS        B_DATA_PKT_14
00000CAF' 1747  3041                    .ADDRESS        B_DATA_PKT_14
00000CAF' 174B  3042                    .ADDRESS        B_DATA_PKT_14
0000068A' 174F  3043                    .ADDRESS        MB_END_PACKET_4
          1753  3044
000004BC' 1753  3045                    .ADDRESS        MB_READ_14_CMD
00000CAF' 1757  3046                    .ADDRESS        B_DATA_PKT_14
00000CAF' 175B  3047                    .ADDRESS        B_DATA_PKT_14
00000CAF' 175F  3048                    .ADDRESS        B_DATA_PKT_14
00000CAF' 1763  3049                    .ADDRESS        B_DATA_PKT_14
0000068A' 1767  3050                    .ADDRESS        MB_END_PACKET_4
          176B  3051
          176B  3052 ; This is the packet list for the "record write read" subtest
          176B  3053
000004E6' 176B  3054 MCOMMAND_TBL_4:    .ADDRESS        MB_WRITE_18_CMD
00000EBF' 176F  3055                    .ADDRESS        B_DATA_PKT_18
00000EBF' 1773  3056                    .ADDRESS        B_DATA_PKT_18
000006D0' 1777  3057                    .ADDRESS        MB_END_PACKET_9
          177B  3058
000004F4' 177B  3059                    .ADDRESS        MB_READ_16_CMD
00000EBF' 177F  3060                    .ADDRESS        B_DATA_PKT_18
00000EBF' 1783  3061                    .ADDRESS        B_DATA_PKT_18
000006D0' 1787  3062                    .ADDRESS        MB_END_PACKET_9
          178B  3063
00000502' 178B  3064                    .ADDRESS        MB_WRITE_19_CMD
00000F43' 178F  3065                    .ADDRESS        B_DATA_PKT_19
00000698' 1793  3066                    .ADDRESS        MB_END_PACKET_5
          1797  3067
00000510' 1797  3068                    .ADDRESS        MB_READ_17_CMD
00000F43' 179B  3069                    .ADDRESS        B_DATA_PKT_19
00000698' 179F  3070                    .ADDRESS        MB_END_PACKET_5
          17A3  3071
0000051E' 17A3  3072                    .ADDRESS        MB_WRITE_20_CMD
00000FC7' 17A7  3073                    .ADDRESS        B_DATA_PKT_20
00000698' 17AB  3074                    .ADDRESS        MB_END_PACKET_5
          17AF  3075
0000052C' 17AF  3076                    .ADDRESS        MB_READ_18_CMD
00000FC7' 17B3  3077                    .ADDRESS        B_DATA_PKT_20
00000698' 17B7  3078                    .ADDRESS        MB_END_PACKET_5
          17BB  3079
00000556' 17BB  3080                    .ADDRESS        MB_WRITE_22_CMD
00001137' 17BF  3081                    .ADDRESS        B_DATA_PKT_23
00000698' 17C3  3082                    .ADDRESS        MB_END_PACKET_5
          17C7  3083
```

```
00000564' 17C7  3084                    .ADDRESS        MB_READ_20_CMD
00001137' 17CB  3085                    .ADDRESS        B_DATA_PKT_23
00000698' 17CF  3086                    .ADDRESS        MB_END_PACKET_5
          17D3  3087
00000572' 17D3  3088                    .ADDRESS        MB_WRITE_23_CMD
000011BB' 17D7  3089                    .ADDRESS        B_DATA_PKT_24
00000698' 17DB  3090                    .ADDRESS        MB_END_PACKET_5
          17DF  3091
00000580' 17DF  3092                    .ADDRESS        MB_READ_21_CMD
000011BB' 17E3  3093                    .ADDRESS        B_DATA_PKT_24
00000698' 17E7  3094                    .ADDRESS        MB_END_PACKET_5
          17EB  3095
          17EB  3096
000005AA' 17EB  3097 MCOMMAND_TBL_5:    .ADDRESS        MB_READ_23_CMD
0000089B' 17EF  3098                    .ADDRESS        B_DATA_PKT_6
0000089B' 17F3  3099                    .ADDRESS        B_DATA_PKT_6
0000089B' 17F7  3100                    .ADDRESS        B_DATA_PKT_6
0000089B' 17FB  3101                    .ADDRESS        B_DATA_PKT_6
0000068A' 17FF  3102                    .ADDRESS        MB_END_PACKET_4
          1803  3103
000005B8' 1803  3104                    .ADDRESS        MB_READ_24_CMD
00000C2B' 1807  3105                    .ADDRESS        B_DATA_PKT_13
00000C2B' 180B  3106                    .ADDRESS        B_DATA_PKT_13
00000C2B' 180F  3107                    .ADDRESS        B_DATA_PKT_13
00000C2B' 1813  3108                    .ADDRESS        B_DATA_PKT_13
0000068A' 1817  3109                    .ADDRESS        MB_END_PACKET_4
          181B  3110
000005C6' 181B  3111                    .ADDRESS        MB_POS_1_CMD
00000660' 181F  3112                    .ADDRESS        MB_END_PACKET_1
          1823  3113
000005AA' 1823  3114                    .ADDRESS        MB_READ_23_CMD
0000089B' 1827  3115                    .ADDRESS        B_DATA_PKT_6
0000089B' 182B  3116                    .ADDRESS        B_DATA_PKT_6
0000089B' 182F  3117                    .ADDRESS        B_DATA_PKT_6
0000089B' 1833  3118                    .ADDRESS        B_DATA_PKT_6
0000068A' 1837  3119                    .ADDRESS        MB_END_PACKET_4
          183B  3120
```

```
                                        183B  3122 .SBTTL ERROR MESSAGES
                                        183B  3123 ;-----------------------------------------------------------------------
                                        183B  3124 T_INIT1_ERR:
20 67 6E 69 74 70 6D 65 74 74 61 00'    183B  3125         .ASCIC "attempting to initialize TU58 CONTROLLER."
7A 69 6C 61 69 74 69 6E 69 20 6F 74     1847
52 54 4E 4F 43 20 38 35 55 54 20 65     1853
                  2E 52 45 4C 4C 4F     185F
                                  29    183B
                                        1865  3126 ;-----------------------------------------------------------------------
                                        1865  3127 T_INIT2_ERR:
20 67 6E 69 74 70 6D 65 74 74 61 00'    1865  3128         .ASCIC "attempting an INITIALIZE function."
5A 49 4C 41 49 54 49 4E 49 20 6E 61     1871
   2E 6E 6F 69 74 63 6E 75 66 20 45     187D
                                  22    1865
                                        1888  3129 ;-----------------------------------------------------------------------
                                        1888  3130 T_SLF_DIAG_ERR:
20 67 6E 69 74 70 6D 65 74 74 61 00'    1888  3131         .ASCIC "attempting a SELF-DIAGNOSE function."
4E 47 41 49 44 2D 46 4C 45 53 20 61     1894
6E 6F 69 74 63 6E 75 66 20 45 53 4F     18A0
                                  2E    18AC
                                  24    1888
                                        18AD  3132 ;-----------------------------------------------------------------------
                                        18AD  3133 T_NOP_ERR:
20 67 6E 69 74 70 6D 65 74 74 61 00'    18AD  3134         .ASCIC "attempting a NOP function."
69 74 63 6E 75 66 20 50 4F 4E 20 61     18B9
                              2E 6E 6F  18C5
                                  1A    18AD
                                        18C8  3135 ;-----------------------------------------------------------------------
                                        18C8  3136 T_WR_BLK_ERR:
20 67 6E 69 74 70 6D 65 74 74 61 00'    18C8  3137         .ASCIC "attempting a WRITE BLOCK function."
43 4F 4C 42 20 45 54 49 52 57 20 61     18D4
   2E 6E 6F 69 74 63 6E 75 66 20 4B     18E0
                                  22    18C8
                                        18EB  3138 ;-----------------------------------------------------------------------
                                        18EB  3139 T_RD_BLK_ERR:
20 67 6E 69 74 70 6D 65 74 74 61 00'    18EB  3140         .ASCIC "attempting a READ BLOCK function."
4B 43 4F 4C 42 20 44 41 45 52 20 61     18F7
      2E 6E 6F 69 74 63 6E 75 66 20     1903
                                  21    18EB
                                        190D  3141 ;-----------------------------------------------------------------------
                                        190D  3142 T_WR_REC_ERR:
20 67 6E 69 74 70 6D 65 74 74 61 00'    190D  3143         .ASCIC "attempting a WRITE RECORD function."
4F 43 45 52 20 45 54 49 52 57 20 61     1919
2E 6E 6F 69 74 63 6E 75 66 20 44 52     1925
                                  23    190D
                                        1931  3144 ;-----------------------------------------------------------------------
                                        1931  3145 T_RD_REC_ERR:
20 67 6E 69 74 70 6D 65 74 74 61 00'    1931  3146         .ASCIC "attempting a READ RECORD function."
52 4F 43 45 52 20 44 41 45 52 20 61     193D
   2E 6E 6F 69 74 63 6E 75 66 20 44     1949
                                  22    1931
                                        1954  3147 ;-----------------------------------------------------------------------
                                        1954  3148 T_WR_MOD_ERR:
20 67 6E 69 74 70 6D 65 74 74 61 00'    1954  3149         .ASCIC "attempting a WRITE MODIFIED function."
49 44 4F 4D 20 45 54 49 52 57 20 61     1960
```

```
6F 69 74 63 6E 75 66 20 44 45 49 46  196C
                              2E 6E  1978
                                 25  1954
                                     197A  3150 ;-----------------------------------------------------------------------
                                     197A  3151 T_RD_MOD_ERR:
20 67 6E 69 74 70 6D 65 74 74 61 00' 197A  3152         .ASCIC "attempting a READ MODIFIED function."
46 49 44 4F 4D 20 44 41 45 52 20 61  1986
6E 6F 69 74 63 6E 75 66 20 44 45 49  1992
                                 2E  199E
                                 24  197A
                                     199F  3153 ;-----------------------------------------------------------------------
                                     199F  3154 T_RD_INT_ERR:
20 67 6E 69 74 70 6D 65 74 74 61 00' 199F  3155         .ASCIC "attempting a READ RECORD INTERRUPT-MODE function."
52 4F 43 45 52 20 44 41 45 52 20 61  19AB
2D 54 50 55 52 52 45 54 4E 49 20 44  19B7
6F 69 74 63 6E 75 66 20 45 44 4F 4D  19C3
                              2E 6E  19CF
                                 31  199F
                                     19D1  3156 ;-----------------------------------------------------------------------
                                     19D1  3157 T_WR_INT_ERR:
20 67 6E 69 74 70 6D 65 74 74 61 00' 19D1  3158         .ASCIC "attempting a WRITE RECORD INTERRUPT-MODE function."
4F 43 45 52 20 45 54 49 52 57 20 61  19DD
54 50 55 52 52 45 54 4E 49 20 44 52  19E9
69 74 63 6E 75 66 20 45 44 4F 4D 2D  19F5
                           2E 6E 6F  1A01
                                 32  19D1
                                     1A04  3159 ;-----------------------------------------------------------------------
                                     1A04  3160 T_IPL_ERR:
20 67 6E 69 74 70 6D 65 74 74 61 00' 1A04  3161         .ASCIC "attempting a NOP function to check IPL."
69 74 63 6E 75 66 20 50 4F 4E 20 61  1A10
20 6B 63 65 68 63 20 6F 74 20 6E 6F  1A1C
                        2E 4C 50 49  1A28
                                 27  1A04
                                     1A2C  3162 ;-----------------------------------------------------------------------
                                     1A2C  3163 T_INT_ERR:
74 70 75 72 72 65 74 6E 49 20 20 00' 1A2C  3164         .ASCIC "  Interrupt occurred when IPL should have prohibited it."
68 77 20 64 65 72 72 75 63 63 6F 20  1A38
6C 75 6F 68 73 20 4C 50 49 20 6E 65  1A44
69 68 6F 72 70 20 65 76 61 68 20 64  1A50
         2E 74 69 20 64 65 74 69 62  1A5C
                                 38  1A2C
                                     1A65  3165 ;-----------------------------------------------------------------------
                                     1A65  3166 T_NO_INT_ERR:
20 64 65 74 63 65 70 78 45 20 20 00' 1A65  3167         .ASCIC "  Expected interrupt did not occur."
69 64 20 74 70 75 72 72 65 74 6E 69  1A71
2E 72 75 63 63 6F 20 74 6F 6E 20 64  1A7D
                                 23  1A65
                                     1A89  3168 ;-----------------------------------------------------------------------
                                     1A89  3169 T_SEND_INT_ERR:
20 64 65 74 63 65 70 78 45 20 20 00' 1A89  3170         .ASCIC "  Expected INTERRUPT did not occur while sending DATA packet.!/"
69 64 20 54 50 55 52 52 45 54 4E 49  1A95
20 72 75 63 63 6F 20 74 6F 6E 20 64  1AA1
6E 69 64 6E 65 73 20 65 6C 69 68 77  1AAD
65 6B 63 61 70 20 41 54 41 44 20 67  1AB9
                           2F 21 2E 74  1AC5
```

```
                                3F  1A89
                                    1AC9  3171 SEND_INT_ERR:
                                    1AC9  3172          $DS_BGNMESSAGE
                                    1ACB  3173          $DS_PRINTF_S    FORMAT=T_SEND_INT_ERR
                                    1AD5  3174          $DS_ENDMESSAGE
                                    1AD6  3175 ;-----------------------------------------------------------------------
                                    1AD6  3176 MSG_1:
                                    1AD6  3177          $DS_BGNMESSAGE
                                    1AD8  3178          $DS_PRINTF_S    FORMAT=T_MSG_1
                                    1AE5  3179          $DS_ENDMESSAGE
                                    1AE6  3180 ;-----------------------------------------------------------------------
                                    1AE6  3181 MSG_2:
                                    1AE6  3182          $DS_BGNMESSAGE
                                    1AE8  3183          $DS_PRINTF_S    FORMAT=T_MSG_2
                                    1AF5  3184          $DS_ENDMESSAGE
                                    1AF6  3185 ;-----------------------------------------------------------------------
                                    1AF6  3186 T_MSG_1:
61 68 74 20 6B 63 65 68 43 2F 21 00' 1AF6  3187          .ASCIC  "!/Check that a test tape is loaded in the drive!/"
70 61 74 20 74 73 65 74 20 61 20 74  1B02
20 64 65 64 61 6F 6C 20 73 69 20 65  1B0E
65 76 69 72 64 20 65 68 74 20 6E 69  1B1A
                        2F 21        1B26
                           31        1AF6
                                    1B28  3188 ;-----------------------------------------------------------------------
                                    1B28  3189 T_MSG_2:
61 68 74 20 6B 63 65 68 43 2F 21 00' 1B28  3190          .ASCIC  "!/Check that the test tape is write enabled!/"
74 20 74 73 65 74 20 65 68 74 20 74  1B34
65 74 69 72 77 20 73 69 20 65 70 61  1B40
      2F 21 64 65 6C 62 61 6E 65 20  1B4C
                              2D     1B28
                                    1B56  3191 ;-----------------------------------------------------------------------
                                    1B56  3192 T_OVERWRITE:
20 38 35 55 54 20 65 68 54 0A 0D 00' 1B56  3193          .ASCIC  <13><10>"The TU58 tape cartridge is not recognized as a"<13><10>-
64 69 72 74 72 61 63 20 65 70 61 74  1B62
65 72 20 74 6F 6E 20 73 69 20 65 67  1B6E
20 73 61 20 64 65 7A 69 6E 67 6F 63  1B7A
74 20 68 63 74 61 72 63 73 0A 0D 61  1B86
20 75 6F 79 20 6F 64 20 2C 65 70 61  1B92
72 65 76 6F 20 6F 74 20 68 73 69 77  1B9E
61 74 20 65 68 74 20 65 74 69 72 77  1BAA
                        3F 65 70     1BB6
                              62     1B56
                                    1BB9  3194                  "scratch tape, do you wish to overwrite the tape?"
                                    1BB9  3195 ;-----------------------------------------------------------------------
                                    1BB9  3196 T_NO_READY:
64 69 64 20 79 64 61 65 52 20 20 00' 1BB9  3197          .ASCIC  "  Ready did not set after sending a byte to TU58."
74 66 61 20 74 65 73 20 74 6F 6E 20  1BC5
61 20 67 6E 69 64 6E 65 73 20 72 65  1BD1
35 55 54 20 6F 74 20 65 74 79 62 20  1BDD
                        2E 38        1BE9
                           31        1BB9
                                    1BEB  3198 NO_READY:
                                    1BEB  3199          $DS_BGNMESSAGE
                                    1BED  3200          $DS_PRINTX_S    FORMAT = T_NO_READY
                                    1BF7  3201          $DS_ENDMESSAGE
```

```
                                        1BF8  3202 ;-----------------------------------------------------------------------
                                        1BF8  3203 T_BAD_CONT:
20 61 74 61 64 20 64 61 42 20 20 00'    1BF8  3204          .ASCIC  "  Bad data in CONTINUE flag.!/!/"
20 45 55 4E 49 54 4E 4F 43 20 6E 69     1C04
          2F 21 2F 21 2E 67 61 6C 66    1C10
                                  20    1BF8
                                        1C19  3205 ;-----------------------------------------------------------------------
                                        1C19  3206 T_BAD_END:
20 61 74 61 64 20 64 61 42 20 20 00'    1C19  3207          .ASCIC  "  Bad data in END packet.!/!/"
65 6B 63 61 70 20 44 4E 45 20 6E 69     1C25
                  2F 21 2F 21 2E 74     1C31
                                  1D    1C19
                                        1C37  3208 ;-----------------------------------------------------------------------
                                        1C37  3209 T_BAD_DATA:
20 61 74 61 64 20 64 61 42 20 20 00'    1C37  3210          .ASCIC  "  Bad data in DATA packet.!/!/"
6B 63 61 70 20 41 54 41 44 20 6E 69     1C43
                  2F 21 2F 21 2E 74 65  1C4F
                                  1E    1C37
                                        1C56  3211 ;-----------------------------------------------------------------------
                                        1C56  3212 T_EXP_CONT:
3A 44 45 54 43 45 50 58 45 20 20 00'    1C56  3213          .ASCIC  "  EXPECTED:    !XB!/"
                  2F 21 42 58 21 09     1C62
                                  11    1C56
                                        1C68  3214 ;-----------------------------------------------------------------------
                                        1C68  3215 T_ACT_CONT:
20 20 3A 4C 41 55 54 43 41 20 20 00'    1C68  3216          .ASCIC  "  ACTUAL:      !XB!/"
                  2F 21 42 58 21 09     1C74
                                  11    1C68
                                        1C7A  3217 ;-----------------------------------------------------------------------
                                        1C7A  3218 T_EXP_DATA:
20 44 45 54 43 45 50 58 45 20 20 00'    1C7A  3219          .ASCIC  "  EXPECTED PACKET ADDRESS:     !XL!/"
45 52 44 44 41 20 54 45 4B 43 41 50     1C86
          2F 21 4C 58 21 09 3A 53 53    1C92
                                  20    1C7A
                                        1C9B  3220 ;-----------------------------------------------------------------------
                                        1C9B  3221 T_ACT_DATA:
41 50 20 4C 41 55 54 43 41 20 20 00'    1C9B  3222          .ASCIC  "  ACTUAL PACKET ADDRESS:       !XL!/"
53 53 45 52 44 44 41 20 54 45 4B 43     1CA7
   2F 21 4C 58 21 09 20 20 20 20 3A     1CB3
                                  22    1C9B
                                        1CBE  3223 ;-----------------------------------------------------------------------
                                        1CBE  3224 T_DUMP_HDR:
3A 44 45 54 43 45 50 58 45 20 20 00'    1CBE  3225          .ASCIC  "  EXPECTED:    ACTUAL:         XOR:!/"
4F 58 09 09 3A 4C 41 55 54 43 41 09     1CCA
                        2F 21 3A 52     1CD6
                                  1B    1CBE
                                        1CDA  3226 ;-----------------------------------------------------------------------
                                        1CDA  3227 T_DUMP_XOR:
20 09 09 42 58 21 20 20 20 20 20 00'    1CDA  3228          .ASCIC  "     !XB                !XB            !XB!/"
2F 21 42 58 21 20 09 09 42 58 21 20     1CE6
                                  17    1CDA
                                        1CF2  3229 ;-----------------------------------------------------------------------
                                        1CF2  3230 T_DUMP_NOXOR:
20 09 09 42 58 21 20 20 20 20 20 00'    1CF2  3231          .ASCIC  "     !XB                !XB!/"
                  2F 21 42 58 21 20     1CFE
```

```
                                    11  1CF2
                                        1D04  3232 ;-----------------------------------------------------------------------
                                        1D04  3233 T_REC_ERR:
74 63 65 72 72 6F 63 6E 49 20 20 00'    1D04  3234          .ASCIC  "  Incorrect number of bytes received.!/!/"
62 20 66 6F 20 72 65 62 6D 75 6E 20     1D10
65 76 69 65 63 65 72 20 73 65 74 79     1D1C
                  2F 21 2F 21 2E 64     1D28
                                    29  1D04
                                        1D2E  3235 ;-----------------------------------------------------------------------
                                        1D2E  3236 T_REC_END:
3A 44 45 54 43 45 50 58 45 20 20 00'    1D2E  3237          .ASCIC  "  EXPECTED: END packet!/"
21 74 65 6B 63 61 70 20 44 4E 45 20     1D3A
                                    2F  1D46
                                    18  1D2E
                                        1D47  3238 ;-----------------------------------------------------------------------
                                        1D47  3239 T_REC_CONT:
3A 44 45 54 43 45 50 58 45 20 20 00'    1D47  3240          .ASCIC  "  EXPECTED: CONTINUE flag = 01!/"
6C 66 20 45 55 4E 49 54 4E 4F 43 20     1D53
         2F 21 31 30 20 3D 20 67 61     1D5F
                                    20  1D47
                                        1D68  3241 ;-----------------------------------------------------------------------
                                        1D68  3242 T_REC_DATA:
3A 44 45 54 43 45 50 58 45 20 20 00'    1D68  3243          .ASCIC  "  EXPECTED: DATA packet beginning at !XL!/"
74 65 6B 63 61 70 20 41 54 41 44 20     1D74
61 20 67 6E 69 6E 6E 69 67 65 62 20     1D80
               2F 21 4C 58 21 20 74     1D8C
                                    2A  1D68
                                        1D93  3244 ;-----------------------------------------------------------------------
                                        1D93  3245 T_EMPTY_BUF:
72 65 77 20 65 72 65 68 54 20 20 00'    1D93  3246          .ASCIC  "  There were no bytes received.!/"
72 20 73 65 74 79 62 20 6F 6E 20 65     1D9F
      2F 21 2E 64 65 76 69 65 63 65     1DAB
                                    21  1D93
                                        1DB5  3247 ;-----------------------------------------------------------------------
                                        1DB5  3248 T_ACT_END:
20 74 73 61 6C 20 65 68 54 20 20 00'    1DB5  3249          .ASCIC  "  The last E(X) bytes received were the following END packet!/"
72 20 73 65 74 79 62 20 29 58 28 45     1DC1
65 72 65 77 20 64 65 76 69 65 63 65     1DCD
69 77 6F 6C 6C 6F 66 20 65 68 74 20     1DD9
65 6B 63 61 70 20 44 4E 45 20 67 6E     1DE5
                           2F 21 74     1DF1
                                    3E  1DB5
                                        1DF4  3250 ;-----------------------------------------------------------------------
                                        1DF4  3251 T_UNREC_DATA:
69 6E 67 6F 63 65 72 6E 55 20 20 00'    1DF4  3252          .ASCIC  "  Unrecognizable packet received.!/"
74 65 6B 63 61 70 20 65 6C 62 61 7A     1E00
2F 21 2E 64 65 76 69 65 63 65 72 20     1E0C
                                    23  1DF4
                                        1E18  3253 ;-----------------------------------------------------------------------
                                        1E18  3254 T_ACT_REC:
21 20 3A 4C 41 55 54 43 41 20 20 00'    1E18  3255          .ASCIC  "  ACTUAL: !XL(X) bytes beginning at !XL!/"
20 73 65 74 79 62 20 29 58 28 4C 58     1E24
74 61 20 67 6E 69 6E 6E 69 67 65 62     1E30
                  2F 21 4C 58 21 20     1E3C
                                    29  1E18
```

```
                                1E42  3256 ;-----------------------------------------------------------------------
                                1E42  3257 T_DUMP_14:
 2F 21 42 58 21 20 20 20 20 20 00' 1E42  3258          .ASCIC  "     !XB!/"
                              0A  1E42
                                1E4D  3259 ;-----------------------------------------------------------------------
                                1E4D  3260 DATA_ERR_CONT:
                                1E4D  3261          $DS_BGNMESSAGE
                                1E4F  3262          $DS_PRINTX_S    FORMAT = T_BAD_CONT
                                1E5A  3263          $DS_PRINTX_S    FORMAT = T_EXP_CONT, P1 = (R10)
                                1E67  3264          $DS_PRINTX_S    FORMAT = T_ACT_CONT, P1 = (R11)
                                1E74  3265          $DS_ENDMESSAGE
                                1E75  3266 ;-----------------------------------------------------------------------
                                1E75  3267 DATA_ERR_DATA:
                                1E75  3268          $DS_BGNMESSAGE
                                1E77  3269          $DS_PRINTX_S    FORMAT = T_BAD_DATA
                                1E82  3270          $DS_PRINTX_S    FORMAT = T_EXP_DATA, P1 = R10
                                1E8F  3271          $DS_PRINTX_S    FORMAT = T_ACT_DATA, P1 = R11
                                1E9C  3272          $DS_ENDMESSAGE
                                1E9D  3273 ;-----------------------------------------------------------------------
                                1E9D  3274 DATA_ERR_END:
                                1E9D  3275          $DS_BGNMESSAGE
                                1E9F  3276          $DS_PRINTX_S    FORMAT = T_BAD_END
                    5C   0E   D0  1EAA  3277          MOVL    #14,R12
           000021E7'EF   16   1EAD  3278          JSB     DUMP_PKT
                                1EB3  3279          $DS_ENDMESSAGE
                                1EB4  3280 ;-----------------------------------------------------------------------
                                1EB4  3281 ; These GPR's are used in the following error-reporting routines:
                                1EB4  3282
                                1EB4  3283 ; R5 contains the next address in the receive buffer to be loaded
                                1EB4  3284 ; R10 contains the address of the beginning of the expected data buffer
                                1EB4  3285 ; R11 contains the address of the beginning of the actual data buffer
                                1EB4  3286
                                1EB4  3287
                                1EB4  3288 REC_ERR:
                                1EB4  3289          $DS_BGNMESSAGE
                                1EB6  3290          $DS_PRINTX_S    FORMAT=T_REC_ERR ; print extended message
 0C E13A CF   02   E0           1EC1  3291          BBS     #V_DATA_FLAG,B_FLAGS,20$ ; br = data packet expected
                                1EC7  3292          $DS_PRINTX_S    FORMAT=@ERR$_P1(AP) ; identify expected packet as
              0C   11           1ED1  3293          BRB     30$                     ;               end or continue
                                1ED3  3294 20$:     $DS_PRINTX_S    FORMAT=@ERR$_P1(AP),P1=R10 ; ident. exp. data packet
 09 E11C CF   03   E1           1EDF  3295 30$:     BBC     #V_END_FLAG,B_FLAGS,50$ ; br = end not expected
         59   5A   D0           1EE5  3296          MOVL    R10,R9                  ; load expected end packet address
     00002227'EF   16           1EE8  3297          JSB     DUMP_14                 ; go print expected end packet
    57   55   5B   C3           1EEE  3298 50$:     SUBL3   R11,R5,R7               ; load actual byte count
              0D   12           1EF2  3299          BNEQ    60$                     ; br = buffer not empty
                                1EF4  3300          $DS_PRINTX_S FORMAT=T_EMPTY_BUF ; print empty buffer message
              3B   11           1EFF  3301          BRB     100$                    ; done if empty buffer
         0E   57   D1           1F01  3302 60$:     CMPL    R7,#14                  ; check byte count
              1C   19           1F04  3303          BLSS    70$                     ; br = less than 14 bytes received
     0000223D'EF   16           1F06  3304          JSB     FIND_END                ; go check for unexpected end packet
                                1F0C  3305          $DS_BNCOMPLETE  70$             ; br = end not found
                                1F0F  3306          $DS_PRINTX_S    FORMAT=T_ACT_END ; print end packet found message
     00002227'EF   16           1F1A  3307          JSB     DUMP_14                 ; print end packet received
              0B   11           1F20  3308          BRB     80$                     ; done
                                1F22  3309 70$:     $DS_PRINTX_S    FORMAT=T_UNREC_DATA ; identify as unknown data
```

```
1F2D  3310 80$:    $DS_PRINTX_S    FORMAT=T_ACT_REC,P1=R7,P2=R11 ; print byte count and
1F3C  3311 100$:   $DS_ENDMESSAGE                                ;       buffer address
1F3D  3312
1F3D  3313 ;-------------------------------------------------------------------------------
1F3D  3314 INT_ERR:
1F3D  3315         $DS_BGNMESSAGE
1F3F  3316         $DS_PRINTX_S    FORMAT=T_INT_ERR
1F4A  3317         $DS_ENDMESSAGE
1F4B  3318 ;-------------------------------------------------------------------------------
1F4B  3319 NO_INT_ERR:
1F4B  3320         $DS_BGNMESSAGE
1F4D  3321         $DS_PRINTX_S    FORMAT=T_NO_INT_ERR
1F58  3322         $DS_ENDMESSAGE
1F59  3323 ;-------------------------------------------------------------------------------
1F59  3324
1F59  3325
1F59  3326
1F59  3327
1F59  3328
1F59  3332
```

```
                        1F59  3334 .SBTTL  SUBROUTINES
                        1F59  3335
                        1F59  3336 ; This subroutine will do an init sequence to the TU58. If the TU58
                        1F59  3337 ; does not respond or does not send a continue, an error will be
                        1F59  3338 ; reported in the main line code. This routine is called at the
                        1F59  3339 ; beginning of each TU58 test. When calling INIT_SEQUENCE R4 must
                        1F59  3340 ; contain the delay time for sending a break.
                        1F59  3341
                        1F59  3342 INIT_SEQUENCE:
          E0A3 CF   94  1F59  3343          CLRB    B_FLAGS                     ; initialize timeout flag
54   FFF85EE0 8F   D0  1F5D  3344          MOVL    #DELAY_TIME2,R4             ; load delay time
          57   02   D0  1F64  3345          MOVL    #2,R7                       ; load number of bytes to send
     55   E0B6 CF   9E  1F67  3346          MOVAB   B_ZEROS,R5                  ; load address of data
          1E   01   DA  1F6C  3347          MTPR    #1,#PR750$_CSTS             ; set break bit          5.2
   0000203D'EF   16  1F6F  3348          JSB     SEND_TU58                   ; send zeros
 4A E086 CF   00   E0  1F75  3349 1$:      BBS     #V_CLOCK_FLAG,B_FLAGS,10$ ; exit if timer expired
          59   1D   DB  1F7B  3350          MFPR    #PR750$_CSRD,R9             ; dump receiver register 5.2
          E07E CF   94  1F7E  3351          CLRB    B_FLAGS                     ; initialze flags
54   FFF85EE0 8F   D0  1F82  3352 2$:      MOVL    #DELAY_TIME2,R4             ; load delay time
          57   02   D0  1F89  3353          MOVL    #2,R7                       ; load byte count
     55   E08F CF   9E  1F8C  3354          MOVAB   B_INIT_DRIVE,R5             ; load init flag
   0000203D'EF   16  1F91  3355          JSB     SEND_TU58                   ; send init
 28 E064 CF   00   E0  1F97  3356          BBS     #V_CLOCK_FLAG,B_FLAGS,10$ ; check for timeout error
54   FFFB6C20 8F   D0  1F9D  3357          MOVL    #DELAY_TIME1,R4             ; load delay time
55   00000000'FF   DE  1FA4  3358          MOVAL   @A_BUFFER_BEGIN,R5          ; load buffer address
     57   55   01   C1  1FAB  3359          ADDL3   #1,R5,R7                    ; load last expected address
   00002083'EF   16  1FAF  3360          JSB     RECEIVE_TU58                ; get continue from TU58
          57   55   D1  1FB5  3361          CMPL    R5,R7                       ; check for correct number of bytes
               05   13  1FB8  3362          BEQL    8$                          ; br = correct number of bytes
     E041 CF   02   88  1FBA  3363          BISB2   #M_RECEIVE_FLAG,B_FLAGS     ; set receive flag to determine error
          59   1D   DB  1FBF  3364 8$:      MFPR    #PR750$_CSRD,R9             ; dump receiver once more 5.2
                0005  31  1FC2  3365          BRW     12$                         ; br to return
     E036 CF   10   88  1FC5  3366 10$:     BISB2   #M_SEND_FLAG,B_FLAGS        ; set send error flag
               05   05  1FCA  3367 12$:     RSB                                 ; return
                        1FCB  3368
                        1FCB  3369
                        1FCB  3370 ; This subroutine will do an init sequence to the TU58. If the TU58
                        1FCB  3371 ; does not respond or does not send a continue, an error will be
                        1FCB  3372 ; reported in the main line code. This routine is called at the
                        1FCB  3373 ; beginning of each TU58 test. When calling INIT_SEQUENCE R4 must
                        1FCB  3374 ; contain the delay time for sending a break.
                        1FCB  3375
                        1FCB  3376 MINIT_SEQUENCE:
          E031 CF   94  1FCB  3377          CLRB    B_FLAGS                     ; initialize timeout flag
54   FFF85EE0 8F   D0  1FCF  3378          MOVL    #DELAY_TIME2,R4             ; load delay time
          57   02   D0  1FD6  3379          MOVL    #2,R7                       ; load number of bytes to send
     55   E044 CF   9E  1FD9  3380          MOVAB   B_ZEROS,R5                  ; load address of data
          1E   01   DA  1FDE  3381          MTPR    #1,#PR750$_CSTS             ; set break bit  5.2
   0000203D'EF   16  1FE1  3382          JSB     SEND_TU58                   ; send zeros
 4A E014 CF   00   E0  1FE7  3383 1$:      BBS     #V_CLOCK_FLAG,B_FLAGS,10$ ; exit if timer expired
          59   1D   DB  1FED  3384          MFPR    #PR750$_CSRD,R9             ; dump receiver register 5.2
          E00C CF   94  1FF0  3385          CLRB    B_FLAGS                     ; initialze flags
54   FFF85EE0 8F   D0  1FF4  3386 2$:      MOVL    #DELAY_TIME2,R4             ; load delay time
          57   02   D0  1FFB  3387          MOVL    #2,R7                       ; load byte count
     55   E01D CF   9E  1FFE  3388          MOVAB   B_INIT_DRIVE,R5             ; load init flag
```

```
                0000203D'EF   16  2003  3389          JSB     SEND_TU58                       ; send init
             28 DFF2 CF    00   E0  2009  3390          BBS     #V_CLOCK_FLAG,B_FLAGS,10$ ; check for timeout error
            54   FFFB6C20 8F   D0  200F  3391          MOVL    #DELAY_TIME1,R4                 ; load delay time
            55   00000000'FF   DE  2016  3392          MOVAL   @A_BUFFER_BEGIN,R5              ; load buffer address
                57   55    01   C1  201D  3393          ADDL3   #1,R5,R7                        ; load last expected address
                 000020C8'EF   16  2021  3394          JSB     MRECEIVE_TU58                   ; get continue from TU58
                     57   55   D1  2027  3395          CMPL    R5,R7                           ; check for correct number of bytes
                          05   13  202A  3396          BEQL    8$                              ; br = correct number of bytes
                DFCF CF    02   88  202C  3397          BISB2   #M_RECEIVE_FLAG,B_FLAGS ; set receive flag to determine error
                     59    1D   DB  2031  3398 8$:      MFPR    #PR750$_CSRD,R9                 ; dump receiver once more   5.2
                        0005   31  2034  3399          BRW     12$                             ; br to return
                DFC4 CF    10   88  2037  3400 10$:     BISB2   #M_SEND_FLAG,B_FLAGS    ; set send error flag
                          05   05  203C  3401 12$:     RSB                                     ; return
                               203D  3402
                               203D  3403
                               203D  3404 ; This subroutine is used to transmit command and data packets to the
                               203D  3405 ; TU58. When called the following general purpose registers are used:
                               203D  3406 ;
                               203D  3407 ;       R4 contains the initial time delay for a response from the TU58.
                               203D  3408 ;       R5 contains the starting address of the data to be sent.
                               203D  3409 ;       R6 is used to read the transmitter status and determine if ready is set.
                               203D  3410 ;       R7 contains the number of bytes to be sent.
                               203D  3411 ;       R8 is used as temporary data storage.
                               203D  3412
                               203D  3413 SEND_TU58:
                     DFBF CF   94  203D  3414          CLRB    B_FLAGS                         ; initialize timeout flag
                     19   54   DA  2041  3415 1$:      MTPR    R4,#PR750$_NICR                 ; load clock with time 5.2
                00000000'8F   10   DA  2044  3416          MTPR    #M_TRANSFER,#PR$_ICCS   ; transfer time to ICR
                     19   01   DA  204B  3417          MTPR    #1,#PR750$_NICR                 ; load next interval with long time 5.2
                     58   85   9A  204E  3418          MOVZBL  (R5)+,R8                        ; load byte to send into R8
                     1F   58   DA  2051  3419          MTPR    R8,#PR750$_CSTD                 ; load byte to send 5.2
00000000'8F    80000041   8F   DA  2054  3420          MTPR    #<M_ERROR+M_ENABLE+M_RUN>,#PR$_ICCS ; start timer
          1D DF9C CF    00   E0  205F  3421 2$:      BBS     #V_CLOCK_FLAG,B_FLAGS,3$ ; check for timeout
                     56   1E   DB  2065  3422          MFPR    #PR750$_CSTS,R6                 ; read transmitter status 5.2
                   F3 56   07   E1  2068  3423          BBC     #V_READY,R6,2$                  ; check for ready
00000000'8F    80000080   8F   DA  206C  3424          MTPR    #<M_ERROR+M_INTERRUPT>,#PR$_ICCS ; ready, stop clock
          54   FFFB6C20   8F   D0  2077  3425          MOVL    #DELAY_TIME1,R4                 ; load delay time
                          57   D7  207E  3426          DECL    R7                              ; count byte
                          BF   12  2080  3427          BNEQ    1$                              ; br = not finished
                               05  2082  3428 3$:      RSB                                     ; return
                               2083  3429
                               2083  3430 ; This subroutine is used to receive data and end packets from the TU58.
                               2083  3431 ; When called the following general purpose registers are used:
                               2083  3432 ;
                               2083  3433 ;       R4 contains the initial time delay for a response from the TU58.
                               2083  3434 ;       R5 contains the starting buffer address of where the data is read to.
                               2083  3435 ;       R6 is used to read the transmitter status and determine if ready is set.
                               2083  3436 ;       R7 contains the expected end of receive buffer.
                               2083  3437
                               2083  3438 RECEIVE_TU58:
                     DF79 CF   94  2083  3439          CLRB    B_FLAGS                         ; initialize flags
                     19   54   DA  2087  3440 1$:      MTPR    R4,#PR750$_NICR                 ; load clock with time 5.2
                00000000'8F   10   DA  208A  3441          MTPR    #M_TRANSFER,#PR$_ICCS   ; transfer time to ICR
                     19   01   DA  2091  3442          MTPR    #1,#PR750$_NICR                 ; load next interval with long time 5.2
00000000'8F    80000041   8F   DA  2094  3443          MTPR    #<M_ERROR+M_ENABLE+M_RUN>,#PR$_ICCS ; start timer
```

```
                56   1C   DB   209F   3444 2$:     MFPR    #PR750$_CSRS,R6          ; read receiver status  5.2
          1F DF59 CF   00   E0   20A2   3445         BBS     #V_CLOCK_FLAG,B_FLAGS,3$ ; check for timeout
             F3 56     07   E1   20A8   3446         BBC     #V_DONE,R6,2$            ; check for done
00000000'8F   80000080 8F   DA   20AC   3447         MTPR    #<M_ERROR+M_INTERRUPT>,#PR$_ICCS ; done, stop clock
                65     1D   DB   20B7   3448         MFPR    #PR750$_CSRD,(R5)                ; read byte  5.2
          54   FFF0BDC0 8F   D0   20BA   3449         MOVL    #DELAY_TIME4,R4          ; load delay time
           C0 55   DF4E CF   F2   20C1   3450         AOBLSS  BUF_LIM,R5,1$            ; br = not finished, get another byte
                          05   20C7   3451 3$:      RSB                              ; return
                               20C8   3452
                               20C8   3453
                               20C8   3454 ; This routine is used to receive data and end packets from the new TU58.
                               20C8   3455 ; The new TU58 have MRSP instead of RSP.
                               20C8   3456 ;
                               20C8   3457 MRECEIVE_TU58:
                DF34 CF   94   20C8   3458         CLRB    B_FLAGS                  ;initialize flags
                19   54   DA   20CC   3459 1$:     MTPR    R4,#PR750$_NICR          ;load clock with time 5.2
          00000000'8F   10   DA   20CF   3460         MTPR    #M_TRANSFER,#PR$_ICCS    ;transfer time ti ICR
                19   01   DA   20D6   3461         MTPR    #1,#PR750$_NICR          ;load next interval with long time 5.2
00000000'8F   80000041 8F   DA   20D9   3462         MTPR    #<M_ERROR+M_ENABLE+M_RUN>,#PR$_ICCS  ;strat timer
                56   1C   DB   20E4   3463 2$:     MFPR    #PR750$_CSRS,R6          ;read receiver status  5.2
          46 DF14 CF   00   E0   20E7   3464         BBS     #V_CLOCK_FLAG,B_FLAGS,3$  ;check for timeout
             F3 56     07   E1   20ED   3465         BBC     #V_DONE,R6,2$            ;check for done
00000000'8F   80000080 8F   DA   20F1   3466         MTPR    #<M_ERROR+M_INTERRUPT>,#PR$_ICCS  ;done, stop clock
                65     1D   DB   20FC   3467         MFPR    #PR750$_CSRD,(R5)                ;read byte 5.2
             DF13 CF   55   D0   20FF   3468         MOVL    R5,TEMP5                 ;store R5
             DF12 CF   57   D0   2104   3469         MOVL    R7,TEMP7                 ;store R7
       54   FFFB6C20 8F   D0   2109   3470         MOVL    #DELAY_TIME1,R4          ;load delay time
                57     01   D0   2110   3471         MOVL    #1,R7                    ;number of byte to be send
          55   DF0C CF   9E   2113   3472         MOVAB   B_CONTINUE,R5            ;point to data address
                FF21 CF   16   2118   3473         JSB     SEND_TU58                ;send data to TU58
          57   DEFB CF   D0   211C   3474         MOVL    TEMP7,R7                 ;restore R7
          55   DEF2 CF   D0   2121   3475         MOVL    TEMP5,R5                 ;restore R5
       54   FFF0BDC0 8F   D0   2126   3476         MOVL    #DELAY_TIME4,R4          ;load delay time
        99 55   DEE2 CF   F2   212D   3477         AOBLSS  BUF_LIM,R5,1$            ;br = not finished, get another byte
                          05   2133   3478 3$:      RSB                              ;return
                               2134   3479
                               2134   3480
                               2134   3481 ; This routine is used to clear a specified buffer area. The following
                               2134   3482 ; general purpose registers are used:
                               2134   3483 ;
                               2134   3484 ;       R8 contains the starting address of the buffer to be cleared.
                               2134   3485 ;       R9 contains the number of bytes to be cleared.
                               2134   3486
                               2134   3487 CLEAR_BUFFER:
                88   94   2134   3488         CLRB    (R8)+                    ; clear a byte
                59   D7   2136   3489         DECL    R9                       ; count a byte
                FA   12   2138   3490         BNEQ    CLEAR_BUFFER             ; br = not finished
                          05   213A   3491         RSB                              ; return
                               213B   3492
                               213B   3493 ; This subroutine is used to compare data and end packets read from the
                               213B   3494 ; TU58 with expected data to determine if an error exists. The data is
                               213B   3495 ; compared on a byte to byte level and sets a flag to signal the caller
                               213B   3496 ; that an error was encountered. The following general purpose registers
                               213B   3497 ; are used:
                               213B   3498 ;
```

```
                        213B  3499 ;       R0 is used as the error flag. R0 = 0, no error. R0 = 1, error.
                        213B  3500 ;       R10 contains the starting address of the expected data.
                        213B  3501 ;       R11 contains the starting address of the actual data.
                        213B  3502 ;       R12 contains the number of bytes to check.
                        213B  3503
                        213B  3504 CHECK_PACKET:
              50   7C   213B  3505          CLRQ    R0                          ; initialize error flag and offset
       6B41   6A41 91   213D  3506 1$:      CMPB    (R10)[R1],(R11)[R1]         ; check a byte
              06   12   2142  3507          BNEQ    2$                          ; br = error
        F5 51 5C   F2   2144  3508          AOBLSS  R12,R1,1$                   ; increment offset, br = not done
              02   11   2148  3509          BRB     3$                          ; br = done
              50   D6   214A  3510 2$:      INCL    R0                          ; flag error
              05   214C  3511 3$:      RSB                                     ; return
                   214D  3512
                   214D  3513
                   214D  3514 ; This interrupt service routine is used to set CLOCK_FLAG in the event
                   214D  3515 ; of a timeout. Is also used to determine when a wait loop time has been
                   214D  3516 ; satisfied.
                   214D  3517
                   214D  3518          .ALIGN  LONG
                   2150  3519 TIMER_SERVICE:
        00'   00  DA   2150  3520          MTPR    #0,S^#PR$_ICCS              ; Turn off the timer
00000000'8F  80000080 8F  DA   2153  3521          MTPR    #<M_ERROR+M_INTERRUPT>,#PR$_ICCS ; stop clock
      DE9D CF   01   88   215E  3522          BISB2   #M_CLOCK_FLAG,B_FLAGS       ; set timeout error flag
              02   2163  3523          REI                                     ; return from interrupt
                   2164  3524
                   2164  3525
                   2164  3526
                   2164  3527 ; This interrupt-service routine reads a byte from the TU58 into the
                   2164  3528 ; location pointed to by R3
                   2164  3529
                   2164  3530          .ALIGN LONG
                   2164  3531 READ_SERVICE:
        63   1D   DB   2164  3532          MFPR    #PR750$_CSRD,(R3)                   ; read byte  5.2
              53   D6   2167  3533          INCL    R3                          ; increment pointer
              02   2169  3534          REI                                     ; return
                   216A  3535
                   216A  3536 ; This interrupt-service routine reads a byte from the TU58 into the
                   216A  3537 ; location pointed to by R3 and send a CONTINUE to TU58
                   216A  3538
                   216A  3539          .ALIGN LONG
                   216C  3540 MREAD_SERVICE:
        56   1C   DB   216C  3541 2$:      MFPR    #PR750$_CSRS,R6             ; read receive status 5.2
     F9 56   07   E1   216F  3542          BBC     #V_DONE,R6,2$               ; check for done
        63   1D   DB   2173  3543          MFPR    #PR750$_CSRD,(R3)                   ; read byte 5.2
              53   D6   2176  3544          INCL    R3                          ; increment pointer
   DE9A CF   55   D0   2178  3545          MOVL    R5,TEMP5                    ; store R5
   DE99 CF   57   D0   217D  3546          MOVL    R7,TEMP7                    ; store R7
55    DE9D CF   9E   2182  3547          MOVAB   B_CONTINUE,R5               ; point to data address
        58   65   9A   2187  3548          MOVZBL  (R5),R8                     ; load byte to sendinot R8
        1F   58   DA   218A  3549          MTPR    R8,#PR750$_CSTD             ; load byte to send 5.2
        57   1E   DB   218D  3550 3$:      MFPR    #PR750$_CSTS,R7             ; read transmitter status 5.2
     F9 57   07   E1   2190  3551          BBC     #V_READY,R7,3$              ; check for ready
57    DE7F CF   D0   2194  3552          MOVL    TEMP5,R5                    ; restore R5
57    DE7E CF   D0   2199  3553          MOVL    TEMP7,R7                    ; restore R7
```

```
                    02  219E  3554          REI                                 ; return
                        219F  3555
                        219F  3556
                        219F  3557 ; This interrupt-service routine sets the read interrupt flag and disables
                        219F  3558 ; the read interrupt.
                        219F  3559
                        219F  3560          .ALIGN LONG
                        21A0  3561 READ_SERVICE2:
              DE5D CF   04  88  21A0  3562          BISB2   #M_RD_INT_FLAG,B_FLAGS3 ; set read interrupt flag
                   1C   00  DA  21A5  3563          MTPR    #0,#PR750$_CSRS         ; disable read interrupt 5.2
                    02      02  21A8  3564          REI                             ; return
                        21A9  3565
                        21A9  3566
                        21A9  3567 ; This interrupt service routine set the read interruptflag and send
                        21A9  3568 ; a continue to TU58
                        21A9  3569
                        21A9  3570          .ALIGN  LONG
                        21AC  3571 MREAD_SERVICE2:
              DE51 CF   04  88  21AC  3572          BISB2   #M_RD_INT_FLAG,B_FLAGS3 ; set read interrupt flag
                   56   1C  DB  21B1  3573 2$:      MFPR    #PR750$_CSRS,R6         ; read receive status           5.2
                F9 56   07  E1  21B4  3574          BBC     #V_DONE,R6,2$           ; check for done
                   63   1D  DB  21B8  3575          MFPR    #PR750$_CSRD,(R3)               ; read byte             5.2
                        53  D6  21BB  3576          INCL    R3                      ; increment pointer
              55    DE62 CF   9E  21BD  3577          MOVAB   B_CONTINUE,R5           ; point to data address
                   58   65  9A  21C2  3578          MOVZBL  (R5),R8                 ; load byte to sendinot R8
                   1F   58  DA  21C5  3579          MTPR    R8,#PR750$_CSTD         ; load byte to send             5.2
                   57   1E  DB  21C8  3580 3$:      MFPR    #PR750$_CSTS,R7         ; read transmitter status       5.2
                F9 57   07  E1  21CB  3581          BBC     #V_READY,R7,3$          ; check for ready
                   FD86 CF  16  21CF  3582          JSB     INIT_SEQUENCE           ; initialize driver
                        02  21D3  3583          REI                             ; return
                        21D4  3584
                        21D4  3585
                        21D4  3586
                        21D4  3587 ; This interrupt-service routine sends a byte to the TU58 from the
                        21D4  3588 ; location pointed to by R5 and increments R5.
                        21D4  3589
                        21D4  3590          .ALIGN LONG
                        21D4  3591 WRITE_SERVICE:
                   1F   65  DA  21D4  3592          MTPR    (R5),#PR750$_CSTD               ; send byte             5.2
                        55  D6  21D7  3593          INCL    R5                      ; increment pointer
                   57   55  D1  21D9  3594          CMPL    R5,R7                   ; finished sending ?
                        08  19  21DC  3595          BLSS    20$                     ; br = not finished
              DE1F CF   02  88  21DE  3596          BISB2   #M_SDONE_FLAG,B_FLAGS3  ; set send done flag
                   1E   00  DA  21E3  3597          MTPR    #0,#PR750$_CSTS         ; disable send interrupt        5.2
                        02  21E6  3598 20$:     REI                             ; return
                        21E7  3599
                        21E7  3600
                        21E7  3601 ; This routine prints the expected data, the actual data, and an XOR
                        21E7  3602 ; for each erroneous byte for the packets described as follows:
                        21E7  3603
                        21E7  3604 ;  R10 contains the address of the first byte of expected data
                        21E7  3605 ;  R11 contains the address of the first byte of actual data
                        21E7  3606 ;  R12 contains the number of bytes in the packet
                        21E7  3607
                        21E7  3608 DUMP_PKT:
```

```
                     59   D4  21E7  3609          CLRL    R9                              ; clear offset
                          21E9  3610          $DS_PRINTX_S    FORMAT=T_DUMP_HDR ; print header
               FAD1  CF   9F  21E9                      PUSHAB  T_DUMP_HDR
          000100E8 9F   01   FB  21ED                      CALLS   #$$N, @#DS$PRINTX
                6B   6A   91  21F4  3611 1$:      CMPB    (R10),(R11)                     ; correct byte ?
                     17   13  21F7  3612          BEQL    2$                              ; br = correct (no XOR required)
             58 6B   6A   CD  21F9  3613          XORL3   (R10),(R11),R8                  ; load XOR
                          21FD  3614          $DS_PRINTX_S    FORMAT=T_DUMP_XOR,P1=(R10),P2=(R11),P3=R8 ; dump bytes
                     58   DD  21FD                      PUSHL   R8
                     6B   DD  21FF                      PUSHL   (R11)
                     6A   DD  2201                      PUSHL   (R10)
               FAD3  CF   9F  2203                      PUSHAB  T_DUMP_XOR
          000100E8 9F   04   FB  2207                      CALLS   #$$N, @#DS$PRINTX
                     0F   11  220E  3615          BRB     3$                              ; do next byte
                          2210  3616 2$:      $DS_PRINTX_S    FORMAT=T_DUMP_NOXOR,P1=(R10),P2=(R11) ; dump bytes
                     6B   DD  2210                      PUSHL   (R11)
                     6A   DD  2212                      PUSHL   (R10)
               FADA  CF   9F  2214                      PUSHAB  T_DUMP_NOXOR
          000100E8 9F   03   FB  2218                      CALLS   #$$N, @#DS$PRINTX
                8B   8A   91  221F  3617 3$:      CMPB    (R10)+,(R11)+                   ; increment pointers
              CE 59   5C   F2  2222  3618          AOBLSS  R12,R9,1$                       ; increment count and br = not done
                     05   11  2226  3619          RSB                                     ; return
                          2227  3620
                          2227  3621
                          2227  3622 ; This subroutine dumps 14 bytes beginning at the location contained in R9.
                          2227  3623
                          2227  3624 DUMP_14:
                     58   D4  2227  3625          CLRL    R8                              ; clear dump count
                          2229  3626 1$:      $DS_PRINTX_S    FORMAT=T_DUMP_14,P1=(R9) ; print byte
                     69   DD  2229                      PUSHL   (R9)
               FC13  CF   9F  222B                      PUSHAB  T_DUMP_14
          000100E8 9F   02   FB  222F                      CALLS   #$$N, @#DS$PRINTX
                     59   D6  2236  3627          INCL    R9                              ; increment pointer
              ED 58   0E   F2  2238  3628          AOBLSS  #14,R8,1$                       ; increment count and br = not done
                     05   11  223C  3629          RSB                                     ; return
                          223D  3630
                          223D  3631
                          223D  3632 ; This subroutine checks whether the 14 bytes preceding the location
                          223D  3633 ; contained in R7 contain and end flag and the correct byte count to be
                          223D  3634 ; interpreted as an end packet.  R0 is set if successful; else clear.
                          223D  3635
                          223D  3636 FIND_END:
                     50   D4  223D  3637          CLRL    R0                              ; clear success code
             59   55   0E   C3  223F  3638          SUBL3   #14,R5,R9                       ; load address of word to check
             E418 CF   69   B1  2243  3639          CMPW    (R9),MB_END_PACKET_1            ; is this an end packet ?
                     02   12  2248  3640          BNEQ    10$                             ; br = not end packet
                     50   D6  224A  3641          INCL    R0                              ; set success code
                     05   11  224C  3642 10$:     RSB                                     ; return
                          224D  3643
                          224D  3644
                          224D  3645
                          224D  3646          $DS_PAGE
```

```
                     224D  3648
                     224D                .SBTTL  TEST 9:  TU58 EXERCISER
                    00000000                    .PSECT  TEST_009, PAGE, NOWRT
                        0014
                        0014  3650 ;++
                        0014  3651 ; Test description:
                        0014  3652 ;
                        0014  3653 ;       This test exercises the TU58 on the VAX-11/750 by performing
                        0014  3654 ;       initialization, self diagnostic and no operation.
                        0014  3655 ;       All information received from the TU58 is checked for errors.
                        0014  3656 ;       All errors detected are reported.
                        0014  3657 ;
                        0014  3658 ;
                        0014  3659 ; Assumptions:
                        0014  3660 ;
                        0014  3661 ;       This subtest does not write or read the TU58. All operations performed
                        0014  3662 ;       deal with the controller only. (NOTE: Test 2 requires a scratch tape).
                        0014  3663 ;
                        0014  3664 ;
                        0014  3665 ;.page
                        0014  3666 ;--
                        0014  3667
                        0014  3668          $DS_BGNTEST     <DEFAULT,TU58,ALL>
                        0014        DATA_009:
                00000000  0014                .LONG   0               ; TEST ARGUMENT TABLE TERMINATOR
                        0018        TEST_009::
                    0000  0018                .WORD   ^M<>            ; ENTRY MASK
                        001A  3669
                        001A  3670
                        001A  3671          ; Set Up
                        001A  3672
                        001A  3673
                        001A  3674          $DS_SETVEC_S    VECTOR=#SCB$L_TIMER,SRVADR=TIMER_SERVICE
                              00    DD    001A                  PUSHL   #0
                    00002150'EF     DF    001C                  PUSHAL  TIMER_SERVICE
                    000000C0 8F     DD    0022                  PUSHL   #SCB$L_TIMER
                 00010160 9F    03  FB    0028                  CALLS   #3, a#DS$SETVEC
                 58 00000000'FF     9E    002F  3675 1$:        MOVAB   @A_BUFFER_BEGIN,R8      ; load buffer starting address
00000013'EF      58 00000092 8F     C1    0036  3676            ADDL3   #146,R8,BUF_LIM         ; construct upper buffer limit
                 59 00000400 8F     D0    0042  3677            MOVL    #1024,R9                ; do both pages
                    00002134'EF     16    0049  3678            JSB     CLEAR_BUFFER            ; go clear buffers
                    00000000'EF     94    004F  3679            CLRB    B_FLAGS                 ; init flags
                    00000001'EF     94    0055  3680            CLRB    B_FLAGS2                ; init flags
                                          005B  3681
                    00001F59'EF     16    005B  3682 2$:        JSB     INIT_SEQUENCE           ; initialize drive
                 5A 00000023'EF     9E    0061  3683            MOVAB   B_CONTINUE,R10          ; load expected data address
                 5B 00000000'FF     9E    0068  3684            MOVAB   @A_BUFFER_BEGIN,R11     ; load actual data address
              2C 00000000'EF    04  E1    006F  3685            BBC     #V_SEND_FLAG,B_FLAGS,5$ ; br = no send error
              DC 00000001'EF    01  E3    0077  3686            BBCS    #V_REPEAT_SEND,B_FLAGS2,2$ ; br = first try and set flag
                                          007F  3687            $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT1_ERR,PRLINK=NO_READY
                    00001BEB'EF     DF    007F                  PUSHAL  NO_READY
                    0000183B'EF     DF    0085                  PUSHAL  T_INIT1_ERR
                             00     DD    008B                  PUSHL   #0
                             01     DD    008D                  PUSHL   #$ER
                                          008F        ;;; TEST 9, SUBTEST 0, ERROR 1
```

```
                000100D0 9F    04    FB  008F                        CALLS   #$$M, a#DS$ERRHARD
                                     0096  3688          $DS_BNCOMPLETE  3$
                         03 50 E9    0096                        BLBC    R0, 3$
                                     0099  3689          $DS_ABORT       TEST
                            50 D4    0099                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                               04    009B                        RET                         ; TERMINATE TEST
                                     009C  3690 3$:      $DS_ABORT
                00010020 9F    6C    FA  009C                        CALLG   (AP), a#DS$ABORT
                                     00A3  3691
              32 00000000'EF   01    E1  00A3  3692 5$:      BBC     #V_RECEIVE_FLAG,B_FLAGS,9$ ; br = no receive error
              A8 00000001'EF   01    E3  00AB  3693          BBCS    #V_REPEAT_SEND,B_FLAGS2,2$ ; br = first try and set flag
                                     00B3  3694 7$:      $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT1_ERR,PRLINK=REC_ERR,-
                                     00B3  3695                      P1=#T_REC_CONT
                     00001D47'8F    DD  00B3                        PUSHL   #T_REC_CONT
                     00001EB4'EF    DF  00B9                        PUSHAL  REC_ERR
                     0000183B'EF    DF  00BF                        PUSHAL  T_INIT1_ERR
                                00  DD  00C5                        PUSHL   #0
                                02  DD  00C7                        PUSHL   #$ER
                                     00C9        ;;; TEST 9, SUBTEST 0, ERROR 2
                000100D0 9F    05    FB  00C9                        CALLS   #$$M, a#DS$ERRHARD
                                     00D0  3696          $DS_BNCOMPLETE  8$
                         03 50 E9    00D0                        BLBC    R0, 8$
                                     00D3  3697          $DS_ABORT       TEST
                            50 D4    00D3                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                               04    00D5                        RET                         ; TERMINATE TEST
                                     00D6  3698 8$:      $DS_ABORT
                00010020 9F    6C    FA  00D6                        CALLG   (AP), a#DS$ABORT
                                     00DD  3699
                         5C    01    D0  00DD  3700 9$:      MOVL    #1,R12                  ; load number of bytes to check
                                     00E0  3701          $DS_BREAK
                00010058 9F    6E    FA  00E0                        CALLG   (SP), a#DS$BREAK
                     0000213B'EF    16  00E7  3702          JSB     CHECK_PACKET            ; go check continue
                                     00ED  3703          $DS_BNCOMPLETE  12$             ; br = continue received
                            39 50 E9    00ED                        BLBC    R0, 12$
            0A 00000001'EF   01    E0  00F0  3704          BBS     #V_REPEAT_SEND,B_FLAGS2,10$ ; br = first try
               00000001'EF   02    88  00F8  3705          BISB2   #M_REPEAT_SEND,B_FLAGS2 ; set repeat flag
                         FF59  31    00FF  3706          BRW     2$                      ; try again
                         52    50    D0  0102  3707 10$:     MOVL    R0,R2                   ; save code for error report
                                     0105  3708          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT1_ERR,PRLINK=DATA_ERR_CONT
                     00001E4D'EF    DF  0105                        PUSHAL  DATA_ERR_CONT
                     0000183B'EF    DF  010B                        PUSHAL  T_INIT1_ERR
                                00  DD  0111                        PUSHL   #0
                                03  DD  0113                        PUSHL   #$ER
                                     0115        ;;; TEST 9, SUBTEST 0, ERROR 3
                000100D0 9F    04    FB  0115                        CALLS   #$$M, a#DS$ERRHARD
                                     011C  3709          $DS_BNCOMPLETE  11$
                         03 50 E9    011C                        BLBC    R0, 11$
                                     011F  3710          $DS_ABORT       TEST
                            50 D4    011F                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                               04    0121                        RET                         ; TERMINATE TEST
                                     0122  3711 11$:     $DS_ABORT
                00010020 9F    6C    FA  0122                        CALLG   (AP), a#DS$ABORT
                                     0129  3712 12$:
                                     0129  3713          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 9.1:   INITIALIZE
                3716 ;+
                3717 ; SUBTEST DESCRIPTION:
                3718 ;
                3719 ;       This subtest sends the TU58 a command packet to perform an initialization
                3720 ;       operation which puts the controller into a known ready state. While
                3721 ;       sending each byte of the packet, a timer is set which will time out if
                3722 ;       the ready bit in the transmitter processor register does not set
                3723 ;       within the alloted time. The same is done for the done bit in the
                3724 ;       receiver processor register while reading a byte from the TU58. When
                3725 ;       this is completed successfully, the returned end packet is compared to
                3726 ;       an expected end packet. If a time out occurs or bad data is
                3727 ;       encountered an error will be reported.
                3728 ;
                3729 ;
                3730 ; SUBTEST STEPS:
                3731 ;
                3732 ;       SUBTEST INITIALIZE
                3733 ;       : Clear buffer
                3734 ;       : Point to initialize command packet
                3735 ;       : REPEAT
                3736 ;       : : Send command packet byte at a time
                3737 ;       : : Set timer
                3738 ;       : : IF timer expired AND no response
                3739 ;       : : : THEN
                3740 ;       : : : Report no response error
                3741 ;       : : : Exit test
                3742 ;       : : ENDIF
                3743 ;       : : UNTIL all bytes sent
                3744 ;       : ENDREPEAT
                3745 ;       : REPEAT
                3746 ;       : : Set timer
                3747 ;       : : IF timer expired AND done set
                3748 ;       : : : THEN
                3749 ;       : : : : Read byte
                3750 ;       : : ENDIF
                3751 ;       : : UNTIL timer expired AND done clear
                3752 ;       : ENDREPEAT
                3753 ;       : IF expected byte count NEQ actual byte count
                3754 ;       : : THEN
                3755 ;       : : : Report error
                3756 ;       : : : Exit test
                3757 ;       : ENDIF
                3758 ;       : Point to expected and actual end packet
                3759 ;       : REPEAT
                3760 ;       : : IF data expected NEQ data received
                3761 ;       : : : THEN
                3762 ;       : : : Report error
                3763 ;       : : : Exit test
                3764 ;       : : ENDIF
                3765 ;       : : UNTIL all data checked
                3766 ;       : ENDREPEAT
                3767 ;      ENDSUBTEST INITIALIZE
                3768 ;
                3769 ;
```

```
                                0129  3770 ;
                                0129  3771 ;
                                0129  3772 ;.page
                                0129  3773 ;-
                                0129  3774
                                0129  3775          $DS_BGNSUB
                                0129        T9_S1::
00010030 9F   00000000'EF   FA  0129                CALLG   $S$, a#DS$BGNSUB
                                0134  3776
          00000000'EF       94  0134  3777        CLRB    B_FLAGS                 ; initialize flags
       58 00000000'FF       9E  013A  3778        MOVAB   @A_BUFFER_BEGIN,R8      ; load buffer starting address
       59 00000400 8F       D0  0141  3779        MOVL    #1024,R9                ; do both pages
          00002134'EF       16  0148  3780        JSB     CLEAR_BUFFER            ; go clear buffers
       54 FFFB6C20 8F       D0  014E  3781        MOVL    #DELAY_TIME1,R4         ; load send packet delay time
       55 00000024'EF       9E  0155  3782        MOVAB   B_INIT_CMD,R5           ; point to init command packet
             57   0E       D0  015C  3783        MOVL    #14,R7                  ; load transfer byte count
          0000203D'EF       16  015F  3784        JSB     SEND_TU58               ; send command packet
    24 00000000'EF   00     E1  0165  3785        BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                                016D  3786        $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT2_ERR,PRLINK=NO_READY
          00001BEB'EF       DF  016D                PUSHAL  NO_READY
          00001865'EF       DF  0173                PUSHAL  T_INIT2_ERR
                   00       DD  0179                PUSHL   #0
                   01       DD  017B                PUSHL   #$ER
                                017D        ;;; TEST 9, SUBTEST 1, ERROR 1
       000100D0 9F   04     FB  017D                CALLS   #$$M, a#DS$ERRHARD
                                0184  3787        $DS_BNCOMPLETE  1$
             03 50   E9      0184                BLBC    R0, 1$
                                0187  3788        $DS_ABORT       TEST
                50   D4      0187                CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                   04       0189                RET                             ; TERMINATE TEST
                                018A  3789 1$:    $DS_ABORT
00010020 9F   6C   FA          018A                CALLG   (AP), a#DS$ABORT
                                0191  3790
54   FFFB6C20 8F   D0          0191  3791 2$:     MOVL    #DELAY_TIME1,R4         ; load receive packet delay time
55    00000000'FF  9E          0198  3792        MOVAB   @A_BUFFER_BEGIN,R5      ; load buffer address to store data
    57   55   0E   C1          019F  3793        ADDL3   #14,R5,R7               ; load last expected address of data
      00002083'EF  16          01A3  3794        JSB     RECEIVE_TU58            ; go get data from TU58
5A    000005D4'EF  9E          01A9  3795        MOVAB   B_END_PACKET_1,R10      ; load address of expected end packet
5B    00000000'FF  9E          01B0  3796        MOVAB   @A_BUFFER_BEGIN,R11     ; load address of actual end packet
         57   55   D1          01B7  3797        CMPL    R5,R7                   ; check for correct number of bytes
              31   13          01BA  3798        BEQL    6$                      ; br = correct number of bytes
00000000'EF   08   88          01BC  3799        BISB2   #M_END_FLAG,B_FLAGS     ; set end error flag
                                01C3  3800 4$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT2_ERR,PRLINK=REC_ERR,-
                                01C3  3801                        P1=#T_REC_END
      00001D2E'8F   DD          01C3                PUSHL   #T_REC_END
      00001EB4'EF   DF          01C9                PUSHAL  REC_ERR
      00001865'EF   DF          01CF                PUSHAL  T_INIT2_ERR
                00  DD          01D5                PUSHL   #0
                02  DD          01D7                PUSHL   #$ER
                                01D9        ;;; TEST 9, SUBTEST 1, ERROR 2
00010D0 9F    05    FB          01D9                CALLS   #$$M, a#DS$ERRHARD
                                01E0  3802        $DS_BNCOMPLETE  5$
             03 50   E9      01E0                BLBC    R0, 5$
                                01E3  3803        $DS_ABORT       TEST
                50   D4      01E3                CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
```

```
                                04  01E5                        RET                     ; TERMINATE TEST
                                    01E6  3804 5$:      $DS_ABORT
          00010020 9F    6C     FA  01E6                        CALLG   (AP), @#DS$ABORT
                                    01ED  3805
                   5C    0E     D0  01ED  3806 6$:      MOVL    #14,R12                 ; load number of bytes to check
                                    01F0  3807          $DS_BREAK
          00010058 9F    6E     FA  01F0                        CALLG   (SP), @#DS$BREAK
               0000213B'EF      16  01F7  3808          JSB     CHECK_PACKET            ; go check end packet
                                    01FD  3809          $DS_BNCOMPLETE  7$              ; br = no error
                      21 50     E9  01FD                        BLBC    R0, 7$
                                    0200  3810          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT2_ERR,PRLINK=DATA_ERR_END
               00001E9D'EF      DF  0200                        PUSHAL  DATA_ERR_END
               00001865'EF      DF  0206                        PUSHAL  T_INIT2_ERR
                         00     DD  020C                        PUSHL   #0
                         03     DD  020E                        PUSHL   #$ER
                                    0210        ;;; TEST 9, SUBTEST 1, ERROR 3
          000100D0 9F    04     FB  0210                        CALLS   #$$M, @#DS$ERRHARD
                                    0217  3811          $DS_BCOMPLETE   7$              ; continue if only data error
                      07 50     E8  0217                        BLBS    R0, 7$
                                    021A  3812          $DS_ABORT
          00010020 9F    6C     FA  021A                        CALLG   (AP), @#DS$ABORT
                                    0221  3813 7$:
                                    0221  3814
                                    0221  3815          $DS_ENDSUB
                                    0221        T9_S1_X:
   00010038 9F   00000000'EF    FA  0221                        CALLG   $S$, @#DS$ENDSUB
                                    022C  3816
                                    022C  3817          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 9.2:  SELF DIAGNOSTIC
                ;+
                ; SUBTEST DESCRIPTION:
                ;
                ;       This subtest sends the TU58 a command packet to run its internal
                ;       diagnostic. While sending each byte of the packet,a timer is set which
                ;       will time out if the ready bit in the transmitter processor register
                ;       does not set within the alloted time. The same is done for the done
                ;       bit in the receiver processor register while reading a byte from the
                ;       TU58. When this is completed successfully, the returned end packet is
                ;       compared to an expected end packet. If a time out occurs or bad data
                ;       is encountered an error will be reported.
                ;
                ;
                ; SUBTEST STEPS:
                ;
                ;       SUBTEST SELF DIAGNOSTIC
                ;       :  Clear buffer
                ;       :  Point to self diagnostic command packet
                ;       :  REPEAT
                ;       :  :  Send command packet byte at a time
                ;       :  :  Set timer
                ;       :  :  IF timer expired AND no response
                ;       :  :  :  THEN
                ;       :  :  :  Report no response error
                ;       :  :  :  Exit test
                ;       :  :  ENDIF
                ;       :  : UNTIL all bytes sent
                ;       :  ENDREPEAT
                ;       :  REPEAT
                ;       :  :  Set timer
                ;       :  :  IF timer expired AND done set
                ;       :  :  :  THEN
                ;       :  :  :  :  Read byte
                ;       :  :  ENDIF
                ;       :  : UNTIL timer expired AND done clear
                ;       :  ENDREPEAT
                ;       :  IF expected byte count NEQ actual byte count
                ;       :  :  THEN
                ;       :  :  :  Report error
                ;       :  :  :  Exit test
                ;       :  ENDIF
                ;       :  Point to expected and actual data
                ;       :  REPEAT
                ;       :  :  IF expected data NEQ received data
                ;       :  :  :  THEN
                ;       :  :  :  Report data error
                ;       :  :  :  Exit test
                ;       :  :  ENDIF
                ;       :  : UNTIL all data checked
                ;       :  ENDREPEAT
                ;      ENDSUBTEST SELF DIAGNOSTIC
                ;
                ;
                ;
```

```
                                  022C  3874 ;.page
                                  022C  3875 ;-
                                  022C  3876          $DS_BGNSUB
                                  022C        T9_S2::
  00010030 9F   0000000C'EF   FA  022C                        CALLG   $S$, a#DS$BGNSUB
                                  0237  3877
                                  0237  3878
                00000000'EF   94  0237  3879          CLRB    B_FLAGS                 ; initialize flags
          58    00000000'FF   9E  023D  3880          MOVAB   @A_BUFFER_BEGIN,R8      ; load buffer starting address
          59    00000400 8F   D0  0244  3881          MOVL    #1024,R9                ; do both pages
                00002134'EF   16  024B  3882          JSB     CLEAR_BUFFER            ; go clear buffers
          54    FFFB6C20 8F   D0  0251  3883          MOVL    #DELAY_TIME1,R4         ; load send packet delay time
          55    00000040'EF   9E  0258  3884          MOVAB   B_DIAGNOSE_CMD,R5       ; point to diagnose command packet
                     57   0E   D0  025F  3885          MOVL    #14,R7                  ; load transfer byte count
                0000203D'EF   16  0262  3886          JSB     SEND_TU58               ; send command packet
       24 00000000'EF   00    E1  0268  3887          BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                                  0270  3888          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_SLF_DIAG_ERR,PRLINK=NO_READY
                00001BEB'EF   DF  0270                        PUSHAL  NO_READY
                00001888'EF   DF  0276                        PUSHAL  T_SLF_DIAG_ERR
                         00   DD  027C                        PUSHL   #0
                         01   DD  027E                        PUSHL   #$ER
                                  0280        ;;; TEST 9, SUBTEST 2, ERROR 1
          000100D0 9F    04   FB  0280                        CALLS   #$$M, a#DS$ERRHARD
                                  0287  3889          $DS_BNCOMPLETE  1$
                     03 50   E9  0287                        BLBC    R0, 1$
                                  028A  3890          $DS_ABORT       TEST
                         50   D4  028A                        CLRL    R0                ; SEND A WARNING TO THE SUPERVISOR
                              04  028C                        RET                       ; TERMINATE TEST
                                  028D  3891 1$:      $DS_ABORT
          00010020 9F    6C   FA  028D                        CALLG   (AP), a#DS$ABORT
                                  0294  3892
          54    FFF3CB00 8F   D0  0294  3893 2$:      MOVL    #DELAY_TIME3,R4         ; load receive packet delay time
          55    00000000'FF   9E  029B  3894          MOVAB   @A_BUFFER_BEGIN,R5      ; load buffer address to store data
              57   55   0E   C1  02A2  3895          ADDL3   #14,R5,R7               ; load last expected address of data
                00002083'EF   16  02A6  3896          JSB     RECEIVE_TU58            ; go get data from TU58
          5A    000005D4'EF   9E  02AC  3897          MOVAB   B_END_PACKET_1,R10      ; load address of expected end packet
          5B    00000000'FF   9E  02B3  3898          MOVAB   @A_BUFFER_BEGIN,R11     ; load address of actual end packet
                     57   55   D1  02BA  3899          CMPL    R5,R7                   ; check for expected number of bytes
                         31   13  02BD  3900          BEQL    6$                      ; br = correct number of bytes
          00000000'EF    08   88  02BF  3901          BISB2   #M_END_FLAG,B_FLAGS     ; set end error flag
                                  02C6  3902 4$:      $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_SLF_DIAG_ERR,PRLINK=REC_ERR,-
                                  02C6  3903                          P1=#T_REC_END
                00001D2E'8F   DD  02C6                        PUSHL   #T_REC_END
                00001EB4'EF   DF  02CC                        PUSHAL  REC_ERR
                00001888'EF   DF  02D2                        PUSHAL  T_SLF_DIAG_ERR
                         00   DD  02D8                        PUSHL   #0
                         02   DD  02DA                        PUSHL   #$ER
                                  02DC        ;;; TEST 9, SUBTEST 2, ERROR 2
          000100D0 9F    05   FB  02DC                        CALLS   #$$M, a#DS$ERRHARD
                                  02E3  3904          $DS_BNCOMPLETE  5$
                     03 50   E9  02E3                        BLBC    R0, 5$
                                  02E6  3905          $DS_ABORT       TEST
                         50   D4  02E6                        CLRL    R0                ; SEND A WARNING TO THE SUPERVISOR
                              04  02E8                        RET                       ; TERMINATE TEST
                                  02E9  3906 5$:      $DS_ABORT
```

```
00010020 9F   6C   FA  02E9                          CALLG   (AP), a#DS$ABORT
                      02F0  3907
         5C   0E   D0  02F0  3908 6$:      MOVL    #14,R12                 ; load number of bytes to check
                      02F3  3909           $DS_BREAK
00010058 9F   6E   FA  02F3                          CALLG   (SP), a#DS$BREAK
     0000213B'EF   16  02FA  3910          JSB     CHECK_PACKET            ; go check end packet
                      0300  3911          $DS_BNCOMPLETE  7$              ; br = no error
           21 50   E9  0300                          BLBC    R0, 7$
                      0303  3912          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_SLF_DIAG_ERR,PRLINK=DATA_ERR_END
     00001E9D'EF   DF  0303                          PUSHAL  DATA_ERR_END
     00001888'EF   DF  0309                          PUSHAL  T_SLF_DIAG_ERR
              00   DD  030F                          PUSHL   #0
              03   DD  0311                          PUSHL   #$ER
                      0313       ;;; TEST 9, SUBTEST 2, ERROR 3
000100D0 9F   04   FB  0313                          CALLS   #$$M, a#DS$ERRHARD
                      031A  3913          $DS_BCOMPLETE   7$              ; continue if only data error
           07 50   E8  031A                          BLBS    R0, 7$
                      031D  3914          $DS_ABORT
00010020 9F   6C   FA  031D                          CALLG   (AP), a#DS$ABORT
                      0324  3915 7$:
                      0324  3916
                      0324  3917          $DS_ENDSUB
                      0324       T9_S2_X:
00010038 9F   0000000C'EF   FA  0324                 CALLG   $S$, a#DS$ENDSUB
                      032F  3918
                      032F  3919          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 9.3:  NOP
                ;*
                ; SUBTEST DESCRIPTION:
                ;
                ;       This subtest sends the TU58 a command packet to perform a no
                ;       operation. While sending each byte of the packet, a timer is set which
                ;       will time out if the ready bit in the transmitter processor register
                ;       does not set within the alloted time. The same is done for the done
                ;       bit in the receiver processor register while reading a byte from the
                ;       TU58. When this is completed successfully, the returned end packet is
                ;       compared to an expected end packet. If a time out occurs while expecting
                ;       a byte transfer or bad data is encountered an error will be reported.
                ;
                ;
                ; SUBTEST STEPS:
                ;
                ;       SUBTEST NOP
                ;       : Clear buffer
                ;       : Point to no operation command packet
                ;       : REPEAT
                ;       : : Send command packet byte at a time
                ;       : : Set timer
                ;       : : IF timer expired AND no response
                ;       : : : THEN
                ;       : : : Report no response error
                ;       : : : Exit test
                ;       : : ENDIF
                ;       : : UNTIL all bytes sent
                ;       : ENDREPEAT
                ;       : REPEAT
                ;       : : Set timer
                ;       : : IF timer expired AND done set
                ;       : : : THEN
                ;       : : : : Read byte
                ;       : : ENDIF
                ;       : : UNTIL timer expired AND done clear
                ;       : ENDREPEAT
                ;       : IF expected byte count NEQ actual byte count
                ;       : : THEN
                ;       : : : Report error
                ;       : : : Exit test
                ;       : ENDIF
                ;       : Point to expected and actual end packet
                ;       : REPEAT
                ;       : : IF expected data NEQ received data
                ;       : : : THEN
                ;       : : : Report data error
                ;       : : : Exit test
                ;       : : ENDIF
                ;       : : UNTIL all data checked
                ;       : ENDREPEAT
                ;       ENDSUBTEST NOP
                ;
                ;
                ;
```

```
                                032F  3976 ;.page
                                032F  3977 ;-
                                032F  3978          $DS_BGNSUB
                                032F        T9_S3::
00010030 9F   00000018'EF   FA  032F                CALLG   $S$, a#DS$BGNSUB
                                033A  3979
                                033A  3980
         00000000'EF   94   033A  3981          CLRB    B_FLAGS                 ; initialize flags
      58 00000000'FF   9E   0340  3982          MOVAB   aA_BUFFER_BEGIN,R8      ; load buffer starting address
      59 00000400 8F   D0   0347  3983          MOVL    #1024,R9                ; do both pages
         00002134'EF   16   034E  3984          JSB     CLEAR_BUFFER            ; go clear buffers
      54 FFFB6C20 8F   D0   0354  3985          MOVL    #DELAY_TIME1,R4         ; load send packet delay time
      55 00000032'EF   9E   035B  3986          MOVAB   B_NOP_CMD,R5            ; point to init command packet
            57   0E   D0   0362  3987          MOVL    #14,R7                  ; load transfer byte count
         0000203D'EF   16   0365  3988          JSB     SEND_TU58               ; send command packet
   24 00000000'EF   00   E1   036B  3989          BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                                0373  3990          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_NOP_ERR,PRLINK=NO_READY
         00001BEB'EF   DF   0373                PUSHAL  NO_READY
         000018AD'EF   DF   0379                PUSHAL  T_NOP_ERR
               00      DD   037F                PUSHL   #0
               01      DD   0381                PUSHL   #$ER
                       0383        ;;; TEST 9, SUBTEST 3, ERROR 1
   000100D0 9F   04    FB   0383                CALLS   #$$M, a#DS$ERRHARD
                       038A  3991          $DS_BNCOMPLETE  1$
            03 50      E9   038A                BLBC    R0, 1$
                       038D  3992          $DS_ABORT       TEST
               50      D4   038D                CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                       04   038F                RET                             ; TERMINATE TEST
                       0390  3993 1$:      $DS_ABORT
00010020 9F    6C     FA   0390                CALLG   (AP), a#DS$ABORT
                       0397  3994
54   FFFB6C20 8F      D0   0397  3995 2$:      MOVL    #DELAY_TIME1,R4         ; load receive packet delay time
55   00000000'FF      9E   039E  3996          MOVAB   aA_BUFFER_BEGIN,R5      ; load buffer address to store data
     57   55   0E      C1   03A5  3997          ADDL3   #14,R5,R7               ; load last expected address of data
      00002083'EF      16   03A9  3998          JSB     RECEIVE_TU58            ; go get data from TU58
5A    000005D4'EF      9E   03AF  3999          MOVAB   B_END_PACKET_1,R10      ; load address of expected end packet
5B    00000000'FF      9E   03B6  4000          MOVAB   aA_BUFFER_BEGIN,R11     ; load address of actual end packet
         57   55      D1   03BD  4001          CMPL    R5,R7                   ; check for expected number of bytes
              31      13   03C0  4002          BEQL    6$                      ; br = correct nbumber of bytes
00000000'EF   08      88   03C2  4003          BISB2   #M_END_FLAG,B_FLAGS     ; set end error flag
                       03C9  4004 4$:      $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_NOP_ERR,PRLINK=REC_ERR,-
                       03C9  4005                          P1=#T_REC_END
      00001D2E'8F      DD   03C9                PUSHL   #T_REC_END
      00001EB4'EF      DF   03CF                PUSHAL  REC_ERR
      000018AD'EF      DF   03D5                PUSHAL  T_NOP_ERR
               00      DD   03DB                PUSHL   #0
               02      DD   03DD                PUSHL   #$ER
                       03DF        ;;; TEST 9, SUBTEST 3, ERROR 2
   000100D0 9F   05    FB   03DF                CALLS   #$$M, a#DS$ERRHARD
                       03E6  4006          $DS_BNCOMPLETE  5$
            03 50      E9   03E6                BLBC    R0, 5$
                       03E9  4007          $DS_ABORT       TEST
               50      D4   03E9                CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                       04   03EB                RET                             ; TERMINATE TEST
                       03EC  4008 5$:      $DS_ABORT
```

```
00010020 9F   6C   FA  03EC                          CALLG   (AP), a#DS$ABORT
                     03F3  4009
          5C   0E   D0  03F3  4010 6$:       MOVL    #14,R12                 ; load number of bytes to check
                     03F6  4011              $DS_BREAK
00010058 9F   6E   FA  03F6                          CALLG   (SP), a#DS$BREAK
     0000213B'EF   16  03FD  4012              JSB     CHECK_PACKET            ; go check end packet
                     0403  4013              $DS_BNCOMPLETE  7$              ; br = no error
            21 50  E9  0403                          BLBC    R0, 7$
                     0406  4014              $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_NOP_ERR,PRLINK=DATA_ERR_END
     00001E9D'EF   DF  0406                          PUSHAL  DATA_ERR_END
     000018AD'EF   DF  040C                          PUSHAL  T_NOP_ERR
              00   DD  0412                          PUSHL   #0
              03   DD  0414                          PUSHL   #$ER
                     0416        ;;; TEST 9, SUBTEST 3, ERROR 3
00010000 9F   04   FB  0416                          CALLS   #$$M, a#DS$ERRHARD
                     041D  4015              $DS_BCOMPLETE   7$              ; continue if only data error
            07 50  E8  041D                          BLBS    R0, 7$
                     0420  4016              $DS_ABORT
00010020 9F   6C   FA  0420                          CALLG   (AP), a#DS$ABORT
                     0427  4017 7$:
                     0427  4018
                     0427  4019              $DS_ENDSUB
                     0427        T9_S3_X:
00010038 9F   00000018'EF   FA  0427                  CALLG   $S$, a#DS$ENDSUB
                     0432  4020              $DS_CLRVEC_S    VECTOR=#SCB$L_TIMER
     000000C0 8F   DD  0432                          PUSHL   #SCB$L_TIMER
00010168 9F   01   FB  0438                          CALLS   #1, a#DS$CLRVEC
                     043F  4021
                     043F  4022              $DS_ENDTEST
          50   01   D0  043F                          MOVL    #1, R0          ; NORMAL EXIT
                     0442        TEST_009_X::
00010058 9F   6E   FA  0442                          CALLG   (SP), a#DS$BREAK
              04     0449                          RET                     ; RETURN TO TEST SEQUENCER
                     044A  4023
                     044A  4024              $DS_PAGE
```

```
                        044A                    .SBTTL  TEST 10:  TU58 EXERCISER READ/WRITE
                    00000000                    .PSECT  TEST_010, PAGE, NOWRT
                        001C
                        001C  4027 ;++
                        001C  4028 ; Test description:
                        001C  4029 ;
                        001C  4030 ;       This test exercises the TU58 on the VAX-11/750 by performing
                        001C  4031 ;       position, read (normal and two versions of modified) and write
                        001C  4032 ;       (normal and two versions of modified) commands. Zero padding of
                        001C  4033 ;       blocks and records are also checked for write commands. All end and
                        001C  4034 ;       data packets are checked for errors. Timers are setup to time out if
                        001C  4035 ;       a byte transaction between the host and TU58 is not completed within
                        001C  4036 ;       a reasonable amount of time. If any errors are detected, they are
                        001C  4037 ;       reported with all available information pertaining to the failure.
                        001C  4038 ;
                        001C  4039 ;
                        001C  4040 ; Assumptions:
                        001C  4041 ;
                        001C  4042 ;       This test assumes the scratch tape cartridge used is in good
                        001C  4043 ;       condition. If a marginal tape is used bits may be dropped during the
                        001C  4044 ;       read modified test, which reads with an increased threshold and will
                        001C  4045 ;       consequently report false data errors. Any tape may be used, but
                        001C  4046 ;       existing data will be destroyed. Before the tape is written, the first
                        001C  4047 ;       directory will be read. If the directory read is not "scrat.ch", the
                        001C  4048 ;       operator will be prompted to either overwrite the tape or abort this
                        001C  4049 ;       test. If overwriting the tape is chosen, an attempt to write
                        001C  4050 ;       "scrat.ch" in the first directory area will be made. If an operational
                        001C  4051 ;       error occurs it will be reported, but error detection in this subtest
                        001C  4052 ;       is limited and the primary function is to give the operator an
                        001C  4053 ;       opportunity to remove a tape containing valuable data from the drive
                        001C  4054 ;       and inserting a scratch tape before it is destroyed.
                        001C  4055 ;
                        001C  4056 ;
                        001C  4057 ;.page
                        001C  4058 ;--
                        001C  4059          $DS_BGNTEST     <DEFAULT,TU58,ALL>
                        001C            DATA_010:
                    00000000  001C                  .LONG   0                       ; TEST ARGUMENT TABLE TERMINATOR
                        0020            TEST_010::
                        0000  0020                  .WORD   ^M<>                    ; ENTRY MASK
                        0022  4060
                        0022  4061
                        0022  4062          ; Set Up
                        0022  4063
                        0022  4064          $DS_SETVEC_S    VECTOR=#SCB$L_TIMER,SRVADR=TIMER_SERVICE
                          00    DD  0022                    PUSHL   #0
              00002150'EF     DF  0024                    PUSHAL  TIMER_SERVICE
              000000C0 8F     DD  002A                    PUSHL   #SCB$L_TIMER
          00010160 9F   03    FB  0030                    CALLS   #3, a#DS$SETVEC
                        0037  4065
          58  00000000'FF     9E  0037  4066 1$:          MOVAB   aA_BUFFER_BEGIN,R8      ; load buffer starting address
00000013'EF 58  0000042E 8F     C1  003E  4067              ADDL3   #1070,R8,BUF_LIM        ; construct upper buffer limit
          59  00000400 8F     D0  004A  4068              MOVL    #1024,R9                ; do both pages
              00002134'EF     16  0051  4069              JSB     CLEAR_BUFFER            ; go clear buffers
                        0057  4070
```

```
                00000000'EF   94  0057  4071          CLRB    B_FLAGS                         ; init flags
                00000001'EF   94  005D  4072          CLRB    B_FLAGS2                        ; init flags
                00001F59'EF   16  0063  4073 2$:      JSB     INIT_SEQUENCE                   ; initialize drive
             5A 00000023'EF   9E  0069  4074          MOVAB   B_CONTINUE,R10                  ; load expected data address
             5B 00000000'FF   9E  0070  4075          MOVAB   @A_BUFFER_BEGIN,R11             ; load actual data address
          2C 00000000'EF   04  E1  0077  4076          BBC     #V_SEND_FLAG,B_FLAGS,5$ ; br = no send error
          DC 00000001'EF   01  E3  007F  4077          BBCS    #V_REPEAT_SEND,B_FLAGS2,2$ ; br = first try and set flag
                                   0087  4078          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT1_ERR,PRLINK=NO_READY
                00001BEB'EF   DF  0087                        PUSHAL  NO_READY
                0000183B'EF   DF  008D                        PUSHAL  T_INIT1_ERR
                         00   DD  0093                        PUSHL   #0
                         01   DD  0095                        PUSHL   #$ER
                              0097        ;;; TEST 10, SUBTEST 0, ERROR 1
             000100D0 9F   04  FB  0097                        CALLS   #$$M, @#DS$ERRHARD
                              009E  4079          $DS_BNCOMPLETE  3$
                           03 50  E9  009E                        BLBC    R0, 3$
                              00A1  4080          $DS_ABORT       TEST
                         50   D4  00A1                        CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                         04   00A3                        RET                             ; TERMINATE TEST
                              00A4  4081 3$:      $DS_ABORT
             00010020 9F   6C  FA  00A4                        CALLG   (AP), @#DS$ABORT
                              00AB  4082
          32 00000000'EF   01  E1  00AB  4083 5$:      BBC     #V_RECEIVE_FLAG,B_FLAGS,9$ ; br = no receive error
          A8 00000001'EF   01  E3  00B3  4084          BBCS    #V_REPEAT_SEND,B_FLAGS2,2$ ; br = first try and set flag
                              00BB  4085 7$:      $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT1_ERR,PRLINK=REC_ERR,-
                              00BB  4086                      P1=#T_REC_CONT
                00001D47'8F   DD  00BB                        PUSHL   #T_REC_CONT
                00001EB4'EF   DF  00C1                        PUSHAL  REC_ERR
                0000183B'EF   DF  00C7                        PUSHAL  T_INIT1_ERR
                         00   DD  00CD                        PUSHL   #0
                         02   DD  00CF                        PUSHL   #$ER
                              00D1        ;;; TEST 10, SUBTEST 0, ERROR 2
             000100D0 9F   05  FB  00D1                        CALLS   #$$M, @#DS$ERRHARD
                              00D8  4087          $DS_BNCOMPLETE  8$
                           03 50  E9  00D8                        BLBC    R0, 8$
                              00DB  4088          $DS_ABORT       TEST
                         50   D4  00DB                        CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                         04   00DD                        RET                             ; TERMINATE TEST
                              00DE  4089 8$:      $DS_ABORT
             00010020 9F   6C  FA  00DE                        CALLG   (AP), @#DS$ABORT
                              00E5  4090
                      5C   01  D0  00E5  4091 9$:      MOVL    #1,R12                  ; load number of bytes to check
                              00E8  4092          $DS_BREAK
             00010058 9F   6E  FA  00E8                        CALLG   (SP), @#DS$BREAK
                0000213B'EF   16  00EF  4093          JSB     CHECK_PACKET                    ; go check continue packet
                              00F5  4094          $DS_BNCOMPLETE  12$
                        39 50  E9  00F5                        BLBC    R0, 12$
          0A 00000001'EF   01  E0  00F8  4095          BBS     #V_REPEAT_SEND,B_FLAGS2,10$ ; br = first try and set flag
             00000001'EF   02  88  0100  4096          BISB2   #M_REPEAT_SEND,B_FLAGS2
                      FF59   31  0107  4097          BRW     2$
                      52   50  D0  010A  4098 10$:     MOVL    R0,R2                   ; save code for error report
                              010D  4099          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT1_ERR,PRLINK=DATA_ERR_CONT
                00001E4D'EF   DF  010D                        PUSHAL  DATA_ERR_CONT
                0000183B'EF   DF  0113                        PUSHAL  T_INIT1_ERR
                         00   DD  0119                        PUSHL   #0
```

```
                  03   DD  011B                          PUSHL   #$ER
                           011D        ;;; TEST 10, SUBTEST 0, ERROR 3
000100D0 9F       04   FB  011D                          CALLS   #$$M, a#DS$ERRHARD
                           0124  4100          $DS_BNCOMPLETE  11$
              03 50   E9  0124                          BLBC    R0, 11$
                           0127  4101          $DS_ABORT       TEST
                  50   D4  0127                          CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                       04  0129                          RET                         ; TERMINATE TEST
                           012A  4102 11$:     $DS_ABORT
00010020 9F       6C   FA  012A                          CALLG   (AP), a#DS$ABORT
                           0131  4103 12$:
                           0131  4104          $DS_PAGE
```

```
0131                    .SBTTL  SUBTEST 10.1:   READ DIRECTORY
0131  4107 ;+
0131  4108 ; SUBTEST DESCRIPTION:
0131  4109 ;
0131  4110 ;       This subtest sends the TU58 a command packet to read the first entry
0131  4111 ;       in the directory area of the tape. A timer is set which will
0131  4112 ;       time out if the ready bit in the transmitter processor register does
0131  4113 ;       not set within the allotted time. A second timer is set which will
0131  4114 ;       time out if the done bit in the receiver processor register does not
0131  4115 ;       set within the allotted amount of time. If either of these timers
0131  4116 ;       expires while expecting a data transfer an error will be reported
0131  4117 ;       stating the conditions existing at the time of failure.
0131  4118 ;       The returned data packet is examined to see if the directory on the
0131  4119 ;       tape is "scrat.ch". If it is a scratch tape testing continues; if not,
0131  4120 ;       the operator will be prompted to either abort the TU58 exerciser test
0131  4121 ;       or overwrite the tape in the drive. Before entering the appropriate
0131  4122 ;       response on the TTY, the tape cartridge may be replaced with a scratch
0131  4123 ;       tape. In the case of an overwrite, the TU58 will be sent a write
0131  4124 ;       command  packet to write "scrat.ch" in the directory.  Timers are set
0131  4125 ;       which will time out if the appropriate bits do not set within allotted
0131  4126 ;       times. If an error occurs all appropriate information will be
0131  4127 ;       reported. This subtest is not primarily used for error detection, if an
0131  4128 ;       error is encountered, testing should continue with the next subtest
0131  4129 ;       for diagnosis.
0131  4130 ;
0131  4131 ;
0131  4132 ; SUBTEST STEPS:
0131  4133 ;
0131  4134 ;       SUBTEST READ DIRECTORY
0131  4135 ;       :  Clear buffer
0131  4136 ;       :  Point to read command packet
0131  4137 ;       :  REPEAT
0131  4138 ;       :  :  Send byte of command packet
0131  4139 ;       :  :  Set timer
0131  4140 ;       :  :  IF no response AND timer expired
0131  4141 ;       :  :  :  THEN
0131  4142 ;       :  :  :  Report no response error
0131  4143 ;       :  :  :  Exit test
0131  4144 ;       :  :  ENDIF
0131  4145 ;       :  : UNTIL all bytes sent
0131  4146 ;       :  ENDREPEAT
0131  4147 ;       :  REPEAT
0131  4148 ;       :  :  Set timer
0131  4149 ;       :  :  IF timer expired AND done set
0131  4150 ;       :  :  :  THEN
0131  4151 ;       :  :  :  :  Read byte
0131  4152 ;       :  :  ENDIF
0131  4153 ;       :  : UNTIL timer expired AND done clear
0131  4154 ;       :  ENDREPEAT
0131  4155 ;       :  IF expected byte count NEQ actual byte count
0131  4156 ;       :  :  THEN
0131  4157 ;       :  :  :  Report error
0131  4158 ;       :  :  :  Exit test
0131  4159 ;       :  ENDIF
0131  4160 ;       :  Examine data for first directory on tape
```

```
0131  4161 ;        :  IF directory NEQ scrat.ch
0131  4162 ;        :  :  THEN
0131  4163 ;        :  :  WHILE write directory flag EQL zero DO
0131  4164 ;        :  :  :  Prompt operator to overwrite directory
0131  4165 ;        :  :  :  IF response EQL no
0131  4166 ;        :  :  :  :  THEN
0131  4167 ;        :  :  :  :  Exit test
0131  4168 ;        :  :  :  ENDIF
0131  4169 ;        :  :  :  IF response EQL yes
0131  4170 ;        :  :  :  :  THEN
0131  4171 ;        :  :  :  :  Set write directory flag
0131  4172 ;        :  :  :  :  Point to write directory command packet
0131  4173 ;        :  :  :  :  REPEAT
0131  4174 ;        :  :  :  :  :  Send command packet byte at a time
0131  4175 ;        :  :  :  :  :  Set timer
0131  4176 ;        :  :  :  :  :  IF timer expired AND no response
0131  4177 ;        :  :  :  :  :  :  THEN
0131  4178 ;        :  :  :  :  :  :  Report no response error
0131  4179 ;        :  :  :  :  :  :  Exit test
0131  4180 ;        :  :  :  :  :  ENDIF
0131  4181 ;        :  :  :  :  : UNTIL all bytes sent
0131  4182 ;        :  :  :  :  ENDREPEAT
0131  4183 ;        :  :  :  :  Wait for continue
0131  4184 ;        :  :  :  :  Set timer
0131  4185 ;        :  :  :  :  IF timer expired AND no response
0131  4186 ;        :  :  :  :  :  THEN
0131  4187 ;        :  :  :  :  :  Report no response error
0131  4188 ;        :  :  :  :  :  Exit test
0131  4189 ;        :  :  :  :  ENDIF
0131  4190 ;        :  :  :  :  Point to data packet with "scrat.ch" directory
0131  4191 ;        :  :  :  :  REPEAT
0131  4192 ;        :  :  :  :  :  Send data packet byte at a time
0131  4193 ;        :  :  :  :  :  Set timer
0131  4194 ;        :  :  :  :  :  IF timer expired AND no response
0131  4195 ;        :  :  :  :  :  :  THEN
0131  4196 ;        :  :  :  :  :  :  Report no response error
0131  4197 ;        :  :  :  :  :  :  Exit test
0131  4198 ;        :  :  :  :  :  ENDIF
0131  4199 ;        :  :  :  :  : UNTIL all bytes sent
0131  4200 ;        :  :  :  :  ENDREPEAT
0131  4201 ;        :  :  :  :  REPEAT
0131  4202 ;        :  :  :  :  :  Read end packet into buffer byte at a time
0131  4203 ;        :  :  :  :  :  Set timer
0131  4204 ;        :  :  :  :  :  IF timer expired AND no response
0131  4205 ;        :  :  :  :  :  :  THEN
0131  4206 ;        :  :  :  :  :  :  Report no response error
0131  4207 ;        :  :  :  :  :  :  Exit test
0131  4208 ;        :  :  :  :  :  ENDIF
0131  4209 ;        :  :  :  :  :  : UNTIL all bytes read
0131  4210 ;        :  :  :  :  ENDREPEAT
0131  4211 ;        :  :  :  :  Point to expected and received end packets
0131  4212 ;        :  :  :  :  REPEAT
0131  4213 ;        :  :  :  :  :  IF expected data NEQ received data
0131  4214 ;        :  :  :  :  :  :  THEN
0131  4215 ;        :  :  :  :  :  :  Report data error
```

```
                                0131  4216 ;       : : : : : : Exit subtest
                                0131  4217 ;       : : : : : ENDIF
                                0131  4218 ;       : : : : : UNTIL all bytes checked
                                0131  4219 ;       : : : : ENDREPEAT
                                0131  4220 ;       : : : ENDIF
                                0131  4221 ;       : : ENDWHILE
                                0131  4222 ;       : ENDIF
                                0131  4223 ;       ENDSUBTEST READ DIRECTORY
                                0131  4224 ;
                                0131  4225 ;
                                0131  4226 ;
                                0131  4227 ;.page
                                0131  4228 ;-
                                0131  4229
                                0131  4230
                                0131  4231           $DS_BGNSUB
                                0131        T10_S1::
00010030 9F   00000024'EF   FA  0131                  CALLG   $S$, a#DS$BGNSUB
                                013C  4232                                    ; clear buffers
         00000000'EF   94       013C  4233          CLRB    B_FLAGS           ; initialize flags
      58 00000000'FF   9E       0142  4234          MOVAB   aA_BUFFER_BEGIN,R8 ; load buffer starting address
      59 00000400 8F   D0       0149  4235          MOVL    #1024,R9          ; do two pages
         00002134'EF   16       0150  4236          JSB     CLEAR_BUFFER      ; go clear buffers
                                0156  4237                                    ; send read command packet
      54 FF7E4CE0 8F   D0       0156  4238          MOVL    #DELAY_TIME7,R4   ; load send packet delay time
      55 0000004E'EF   9E       015D  4239          MOVAB   B_READ_1_CMD,R5   ; point to read command packet
             57   0E   D0       0164  4240          MOVL    #14,R7            ; load transfer byte count
         0000203D'EF   16       0167  4241          JSB     SEND_TU58         ; send command packet
   24 00000000'EF   00   E1     016D  4242          BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                                0175  4243          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=NO_READY
         00001BEB'EF   DF       0175                        PUSHAL  NO_READY
         00001931'EF   DF       017B                        PUSHAL  T_RD_REC_ERR
                  00   DD       0181                        PUSHL   #0
                  01   DD       0183                        PUSHL   #$ER
                                0185        ;;; TEST 10, SUBTEST 1, ERROR 1
000100D0 9F   04   FB           0185                        CALLS   #$$M, a#DS$ERRHARD
                                018C  4244          $DS_BNCOMPLETE  1$
               03 50   E9       018C                        BLBC    R0, 1$
                                018F  4245          $DS_ABORT       TEST
                  50   D4       018F                        CLRL    R0        ; SEND A WARNING TO THE SUPERVISOR
                  04   FB       0191                        RET               ; TERMINATE TEST
                                0192  4246 1$:     $DS_ABORT
00010020 9F   6C   FA           0192                        CALLG   (AP), a#DS$ABORT
                                0199  4247                                    ; read data and end packet
   54 FAEF00C0 8F   D0           0199  4248 2$:     MOVL    #DELAY_TIME8,R4   ; load receive packet delay time
   55 00000000'FF   9E           01A0  4249          MOVAB   aA_BUFFER_BEGIN,R5 ; load buffer address to store data
57 55 00000092 8F   C1           01A7  4250          ADDL3   #146,R5,R7        ; load last expected address of data
      00002083'EF   16           01AF  4251          JSB     RECEIVE_TU58      ; go get data from TU58
          57   55   D1           01B5  4252          CMPL    R5,R7             ; check for correct number of bytes
               24   13           01B8  4253          BEQL    6$                ; br = correct number of bytes
                                01BA  4254          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=MSG_1
      00001AD6'EF   DF           01BA                        PUSHAL  MSG_1
      00001931'EF   DF           01C0                        PUSHAL  T_RD_REC_ERR
                  00   DD       01C6                        PUSHL   #0
                  02   DD       01C8                        PUSHL   #$ER
```

```
                                01CA        ;;; TEST 10, SUBTEST 1, ERROR 2
000100D0 9F    04    FB         01CA                CALLS   #$$M, a#DS$ERRHARD
                                01D1  4255          $DS_BNCOMPLETE  4$
                03 50    E9     01D1                BLBC    R0, 4$
                                01D4  4256          $DS_ABORT       TEST
                   50    D4     01D4                CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                         04     01D6                RET                     ; TERMINATE TEST
                                01D7  4257
                                01D7  4258 4$:      $DS_ABORT
00010020 9F    6C    FA         01D7                CALLG   (AP), a#DS$ABORT
                                01DE  4259                                  ; check end packet
5A   000005E2'EF     9E         01DE  4260 6$:      MOVAB   B_END_PACKET_2,R10      ; load address of expected end packet
5B   00000000'FF     9E         01E5  4261          MOVAB   @A_BUFFER_BEGIN,R11     ; load address of actual end packet
5B   00000084 8F     C0         01EC  4262          ADDL2   #132,R11                ; skip over data packet in buffer
        5C    0E     D0         01F3  4263          MOVL    #14,R12                 ; load number of bytes to check
                                01F6  4264          $DS_BREAK
00010058 9F    6E    FA         01F6                CALLG   (SP), a#DS$BREAK
     0000213B'EF      16         01FD  4265          JSB     CHECK_PACKET            ; go check end packet
                                0203  4266          $DS_BNCOMPLETE  7$              ; br = no error
                21 50    E9     0203                BLBC    R0, 7$
                                0206  4267          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=DATA_ERR_END
     00001E9D'EF      DF         0206                PUSHAL  DATA_ERR_END
     00001931'EF      DF         020C                PUSHAL  T_RD_REC_ERR
                   00    DD     0212                PUSHL   #0
                   03    DD     0214                PUSHL   #$ER
                                0216        ;;; TEST 10, SUBTEST 1, ERROR 3
000100D0 9F    04    FB         0216                CALLS   #$$M, a#DS$ERRHARD
                                021D  4268          $DS_BCOMPLETE   7$              ; br = data error, but continue
             07 50    E8         021D                BLBS    R0, 7$
                                0220  4269          $DS_ABORT
00010020 9F    6C    FA         0220                CALLG   (AP), a#DS$ABORT
                                0227  4270                                  ; check first directory entry
5A   000006EC'EF     9E         0227  4271 7$:      MOVAB   B_DATA_PKT_1,R10        ; load address of expected data packet
        5A    0E     C0         022E  4272          ADDL2   #14,R10                 ; point to expected first directory entry
5B   00000000'FF     9E         0231  4273          MOVAB   @A_BUFFER_BEGIN,R11     ; load address of actual data packet
        5B    0E     C0         0238  4274          ADDL2   #14,R11                 ; point to actual first directory entry
        5C    06     D0         023B  4275          MOVL    #6,R12                  ; do only directory entry
                                023E  4276          $DS_BREAK
00010058 9F    6E    FA         023E                CALLG   (SP), a#DS$BREAK
     0000213B'EF      16         0245  4277          JSB     CHECK_PACKET            ; go check data packet
                                024B  4278          $DS_BCOMPLETE   8$              ; br =  unknown tape
             03 50    E8         024B                BLBS    R0, 8$
                                024E  4279          $DS_EXIT        SUB             ; exit subtest if scratch tape
              01E5    31         024E                BRW     T10_S1_X            ; EXIT SUBTEST 1
                                0251  4280 8$:      $DS_ASKLGCL_S   T_OVERWRITE,B_RESPONSE,,9$,0,
                   00    DD     0251                PUSHL   #0
                   00    DD     0253                PUSHL   #PAR$_NO
                   00    DD     0255                PUSHL   #0
     00000278'EF      DF         0257                PUSHAL  9$
                   00    DD     025D                PUSHL   #0
     00000012'EF      DF         025F                PUSHAL  B_RESPONSE
     00001B56'EF      DF         0265                PUSHAL  T_OVERWRITE
00010098 9F    07    FB         026B                CALLS   #7, a#DS$ASKLGCL
                                0272  4281          $DS_EXIT        TEST            ; exit test if negative response
        50    01     D0         0272                MOVL    #1,R0               ; NOT AN ERROR
```

```
                1EC2   31  0275                          BRW     TEST_010_X        ; EXIT TEST 10
                           0278  4282                                             ; positive response, write directory
     54   FF7E4CE0 8F   D0  0278  4283 9$:     MOVL    #DELAY_TIME7,R4           ; load send packet delay time
     55   0000005C'EF   9E  027F  4284         MOVAB   B_WRITE_1_CMD,R5          ; point to write command packet
             57   0E    D0  0286  4285         MOVL    #14,R7                    ; load transfer byte count
          0000203D'EF   16  0289  4286         JSB     SEND_TU58                 ; send command packet
  24 00000000'EF   00   E1  028F  4287         BBC     #V_CLOCK_FLAG,B_FLAGS,20$ ; br = no timeout error
                           0297  4288         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
          00001BEB'EF   DF  0297                          PUSHAL  NO_READY
          0000190D'EF   DF  029D                          PUSHAL  T_WR_REC_ERR
                   00   DD  02A3                          PUSHL   #0
                   04   DD  02A5                          PUSHL   #$ER
                           02A7       ;;; TEST 10, SUBTEST 1, ERROR 4
     000100D0 9F   04   FB  02A7                          CALLS   #$$M, @#DS$ERRHARD
                           02AE  4289         $DS_BNCOMPLETE  10$
                03 50   E9  02AE                          BLBC    R0, 10$
                           02B1  4290         $DS_ABORT       TEST
                   50   D4  02B1                          CLRL    R0                ; SEND A WARNING TO THE SUPERVISOR
                        04  02B3                          RET                       ; TERMINATE TEST
                           02B4  4291 10$:    $DS_ABORT
     00010020 9F   6C   FA  02B4                          CALLG   (AP), @#DS$ABORT
                           02BB  4292                                             ; read continue
     54   FFF3CB00 8F   D0  02BB  4293 20$:    MOVL    #DELAY_TIME3,R4           ; load receive packet delay time
     55   00000000'FF   9E  02C2  4294         MOVAB   @A_BUFFER_BEGIN,R5        ; load buffer address to store data
     55   00000096 8F   C0  02C9  4295         ADDL2   #150,R5                   ; get above previous data
         57   55   01   C1  02D0  4296         ADDL3   #1,R5,R7                  ; load last expected address of data
          00002083'EF   16  02D4  4297         JSB     RECEIVE_TU58              ; go get data from TU58
     5A   00000023'EF   9E  02DA  4298         MOVAB   B_CONTINUE,R10            ; load address of expected data
     5B   00000000'FF   9E  02E1  4299         MOVAB   @A_BUFFER_BEGIN,R11       ; load address of buffer
     5B   00000096 8F   C0  02E8  4300         ADDL    #150,R11                  ; point to address of actual data
             57   55   D1  02EF  4301         CMPL    R5,R7                     ; check for correct number of bytes
                   2A   13  02F2  4302         BEQL    60$                       ; br = correct number of bytes
                           02F4  4303 25$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                           02F4  4304                          P1=#T_REC_CONT
          00001D47'8F   DD  02F4                          PUSHL   #T_REC_CONT
          00001EB4'EF   DF  02FA                          PUSHAL  REC_ERR
          0000190D'EF   DF  0300                          PUSHAL  T_WR_REC_ERR
                   00   DD  0306                          PUSHL   #0
                   05   DD  0308                          PUSHL   #$ER
                           030A       ;;; TEST 10, SUBTEST 1, ERROR 5
     000100D0 9F   05   FB  030A                          CALLS   #$$M, @#DS$ERRHARD
                           0311  4305         $DS_BNCOMPLETE  30$
                03 50   E9  0311                          BLBC    R0, 30$
                           0314  4306         $DS_ABORT       TEST
                   50   D4  0314                          CLRL    R0                ; SEND A WARNING TO THE SUPERVISOR
                        04  0316                          RET                       ; TERMINATE TEST
                           0317  4307
                           0317  4308 30$:    $DS_ABORT
     00010020 9F   6C   FA  0317                          CALLG   (AP), @#DS$ABORT
                           031E  4309                                             ; check continue packet
             5C   01   D0  031E  4310 60$:    MOVL    #1,R12                    ; load number of bytes to check
                           0321  4311         $DS_BREAK
     00010058 9F   6E   FA  0321                          CALLG   (SP), @#DS$BREAK
          0000213B'EF   16  0328  4312         JSB     CHECK_PACKET              ; go check continue
                           032E  4313         $DS_BNCOMPLETE  75$               ; br = no error
```

```
                24 50   E9  032E                        BLBC    R0, 75$
                            0331  4314          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_DATA
        00001E75'EF     DF  0331                        PUSHAL  DATA_ERR_DATA
        0000190D'EF     DF  0337                        PUSHAL  T_WR_REC_ERR
                  00    DD  033D                        PUSHL   #0
                  06    DD  033F                        PUSHL   #$ER
                            0341        ;;; TEST 10, SUBTEST 1, ERROR 6
    000100D0 9F   04    FB  0341                        CALLS   #$$M, @#DS$ERRHARD
                            0348  4315          $DS_BNCOMPLETE  70$                 ; br = error, but continue
                03 50   E9  0348                        BLBC    R0, 70$
                            034B  4316          $DS_ABORT       TEST
                  50    D4  034B                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                        04  034D                        RET                         ; TERMINATE TEST
                            034E  4317 70$:     $DS_ABORT
    00010020 9F   6C    FA  034E                        CALLG   (AP), @#DS$ABORT
                            0355  4318                                              ; send data packet
    54   FFFB6C20 8F    D0  0355  4319 75$:     MOVL    #DELAY_TIME1,R4             ; load send packet delay time
    55   000006EC'EF     9E  035C  4320          MOVAB   B_DATA_PKT_1,R5             ; point to data packet
            57   1E     D0  0363  4321          MOVL    #30,R7                      ; load transfer byte count
        0000203D'EF     16  0366  4322          JSB     SEND_TU58                   ; send data packet
  24 00000000'EF   00   E1  036C  4323          BBC     #V_CLOCK_FLAG,B_FLAGS,90$ ; br = no timeout error
                            0374  4324          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
        00001BEB'EF     DF  0374                        PUSHAL  NO_READY
        0000190D'EF     DF  037A                        PUSHAL  T_WR_REC_ERR
                  00    DD  0380                        PUSHL   #0
                  07    DD  0382                        PUSHL   #$ER
                            0384        ;;; TEST 10, SUBTEST 1, ERROR 7
    000100D0 9F   04    FB  0384                        CALLS   #$$M, @#DS$ERRHARD
                            038B  4325          $DS_BNCOMPLETE  80$
                03 50   E9  038B                        BLBC    R0, 80$
                            038E  4326          $DS_ABORT       TEST
                  50    D4  038E                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                        04  0390                        RET                         ; TERMINATE TEST
                            0391  4327 80$:     $DS_ABORT
    00010020 9F   6C    FA  0391                        CALLG   (AP), @#DS$ABORT
                            0398  4328                                              ; read end packet
    54   FF7E4CE0 8F    D0  0398  4329 90$:     MOVL    #DELAY_TIME7,R4             ; load read packet delay time
    55   00000000'FF     9E  039F  4330          MOVAB   @A_BUFFER_BEGIN,R5          ; load buffer address to store data
    55   000000A8 8F     C0  03A6  4331          ADDL2   #168,R5                     ; get above existing data
        57   55   0E    C1  03AD  4332          ADDL3   #14,R5,R7                   ; load last expected address of data
        00002083'EF     16  03B1  4333          JSB     RECEIVE_TU58                ; go get data from TU58
    5A   000005F0'EF     9E  03B7  4334          MOVAB   B_END_PACKET_3,R10          ; load address of expected end packet
    5B   00000000'FF     9E  03BE  4335          MOVAB   @A_BUFFER_BEGIN,R11         ; load address of buffer
    5B   000000A8 8F     C0  03C5  4336          ADDL2   #168,R11                    ; load address of actual end packet
            57   55     D1  03CC  4337          CMPL    R5,R7                       ; check for correct number of bytes
                  31    13  03CF  4338          BEQL    130$                        ; br = correct number of bytes
    00000000'EF   08    88  03D1  4339          BISB2   #M_END_FLAG,B_FLAGS         ; set end error flag
                            03D8  4340 95$:     $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                            03D8  4341                          P1=#T_REC_END
        00001D2E'8F     DD  03D8                        PUSHL   #T_REC_END
        00001EB4'EF     DF  03DE                        PUSHAL  REC_ERR
        0000190D'EF     DF  03E4                        PUSHAL  T_WR_REC_ERR
                  00    DD  03EA                        PUSHL   #0
                  08    DD  03EC                        PUSHL   #$ER
                            03EE        ;;; TEST 10, SUBTEST 1, ERROR 8
```

```
00100D0 9F   05   FB  03EE                        CALLS   #$$M, a#DS$ERRHARD
                  03F5  4342        $DS_BNCOMPLETE  100$
          03 50   E9  03F5                        BLBC    R0, 100$
                  03F8  4343        $DS_ABORT       TEST
             50   D4  03F8                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                  04  03FA                        RET                     ; TERMINATE TEST
                  03FB  4344
                  03FB  4345 100$:  $DS_ABORT
0010020 9F   6C   FA  03FB                        CALLG   (AP), a#DS$ABORT
                  0402  4346                                              ; check end packet
          5C  0E   D0  0402  4347 130$:  MOVL     #14,R12                 ; load number of bytes to check
                  0405  4348        $DS_BREAK
0010058 9F   6E   FA  0405                        CALLG   (SP), a#DS$BREAK
     0000213B'EF  16  040C  4349        JSB     CHECK_PACKET            ; go check end packet
                  0412  4350        $DS_BNCOMPLETE  140$                ; br = no error
          21 50   E9  0412                        BLBC    R0, 140$
                  0415  4351        $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_END
     00001E9D'EF  DF  0415                        PUSHAL  DATA_ERR_END
     0000190D'EF  DF  041B                        PUSHAL  T_WR_REC_ERR
             00   DD  0421                        PUSHL   #0
             09   DD  0423                        PUSHL   #$ER
                  0425        ;;; TEST 10, SUBTEST 1, ERROR 9
00100D0 9F   04   FB  0425                        CALLS   #$$M, a#DS$ERRHARD
                  042C  4352        $DS_BCOMPLETE   140$
          07 50   E8  042C                        BLBS    R0, 140$
                  042F  4353        $DS_ABORT
0010020 9F   6C   FA  042F                        CALLG   (AP), a#DS$ABORT
                  0436  4354 140$:
                  0436  4355
                  0436  4356
                  0436  4357
                  0436  4358        $DS_ENDSUB
                  0436        T10_S1_X:
00010038 9F   00000024'EF   FA  0436                        CALLG   $S$, a#DS$ENDSUB
                  0441  4359
                  0441  4360        $DS_PAGE
```

```
0441                    .SBTTL  SUBTEST 10.2:   WRITE BLOCK
0441   4363 ;*
0441   4364 ; SUBTEST DESCRIPTION:
0441   4365 ;
0441   4366 ;       This subtest sends the TU58 a command packet to write one block
0441   4367 ;       with 512 bytes of data. A continue flag should be returned between
0441   4368 ;       sending each data packet and an end packet is then returned from the
0441   4369 ;       TU58. Four 128-byte data packets are sent to fill one block. All byte
0441   4370 ;       transactions between the host and TU58 are timed. If any timer
0441   4371 ;       times out while expecting a data transfer to occur an error
0441   4372 ;       is reported. The data packets contain alternating bytes of all
0441   4373 ;       ones and all zeroes. The end packet is checked and if any errors
0441   4374 ;       have occured, they are reported.
0441   4375 ;
0441   4376 ;
0441   4377 ; SUBTEST STEPS:
0441   4378 ;
0441   4379 ;       SUBTEST WRITE BLOCK
0441   4380 ;       :  Clear buffer
0441   4381 ;       :  Point to write command packet
0441   4382 ;       :  REPEAT
0441   4383 ;       :  :  Send command packet byte at a time
0441   4384 ;       :  :  Set timer
0441   4385 ;       :  :  IF timer expired AND no response
0441   4386 ;       :  :  :  THEN
0441   4387 ;       :  :  :  Report no response error
0441   4388 ;       :  :  :  Exit test
0441   4389 ;       :  :  ENDIF
0441   4390 ;       :  : UNTIL all bytes sent
0441   4391 ;       :  ENDREPEAT
0441   4392 ;       :  DO for count = 1 to 4
0441   4393 ;       :  :  Wait for continue
0441   4394 ;       :  :  Set timer
0441   4395 ;       :  :  IF timer expired AND no response
0441   4396 ;       :  :  :  THEN
0441   4397 ;       :  :  :  Report no response error
0441   4398 ;       :  :  :  Exit test
0441   4399 ;       :  :  ENDIF
0441   4400 ;       :  :  Point to data packet
0441   4401 ;       :  :  REPEAT
0441   4402 ;       :  :  :  Send data packet byte at a time
0441   4403 ;       :  :  :  Set timer
0441   4404 ;       :  :  :  IF timer expired AND no response
0441   4405 ;       :  :  :  :  THEN
0441   4406 ;       :  :  :  :  Report no response error
0441   4407 ;       :  :  :  :  Exit test
0441   4408 ;       :  :  :  ENDIF
0441   4409 ;       :  :  : UNTIL all bytes sent
0441   4410 ;       :  :  ENDREPEAT
0441   4411 ;       :  ENDDO
0441   4412 ;       :  REPEAT
0441   4413 ;       :  :  Set timer
0441   4414 ;       :  :  IF timer expired AND done set
0441   4415 ;       :  :  :  THEN
0441   4416 ;       :  :  :  :  Read byte
```

```
                     0441  4417 ;        :  : ENDIF
                     0441  4418 ;        :  : UNTIL timer expired AND done clear
                     0441  4419 ;        :  ENDREPEAT
                     0441  4420 ;        :  IF expected byte count NEQ actual byte count
                     0441  4421 ;        :  : THEN
                     0441  4422 ;        :  : : Report error
                     0441  4423 ;        :  : : Exit test
                     0441  4424 ;        :  ENDIF
                     0441  4425 ;        :  REPEAT
                     0441  4426 ;        :  : Point to expected end packet
                     0441  4427 ;        :  : IF expected end packet data NEQ received end packet data
                     0441  4428 ;        :  : : THEN
                     0441  4429 ;        :  : : Report end packet data error
                     0441  4430 ;        :  : ENDIF
                     0441  4431 ;        :  : UNTIL all data checked
                     0441  4432 ;        :  ENDREPEAT
                     0441  4433 ;        ENDSUBTEST WRITE BLOCK
                     0441  4434 ;
                     0441  4435 ;
                     0441  4436 ;
                     0441  4437 ;.page
                     0441  4438 ;-
                     0441  4439          $DS_BGNSUB
                     0441        T10_S2::
00010030 9F  00000030'EF  FA  0441                  CALLG   $S$, a#DS$BGNSUB
                     044C  4440                                          ; clear buffers
         00000000'EF  94  044C  4441          CLRB    B_FLAGS            ; initialize flags
      58 00000000'FF  9E  0452  4442          MOVAB   aA_BUFFER_BEGIN,R8 ; load buffer starting address
      59 00000400 8F  D0  0459  4443          MOVL    #1024,R9           ; do two pages
         00002134'EF  16  0460  4444          JSB     CLEAR_BUFFER       ; go clear buffers
                     0466  4445                                          ; send write command
      54 FFF3CB00 8F  D0  0466  4446          MOVL    #DELAY_TIME3,R4    ; load send packet delay time
      55 0000006A'EF  9E  046D  4447          MOVAB   B_WRITE_2_CMD,R5   ; point to write command packet
            57   0E  D0  0474  4448          MOVL    #14,R7             ; load transfer byte count
         0000203D'EF  16  0477  4449          JSB     SEND_TU58          ; send command packet
24 00000000'EF   00  E1  047D  4450          BBC     #V_CLOCK_FLAG,B_FLAGS,20$ ; br = no timeout error
                     0485  4451          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=NO_READY
         00001BEB'EF  DF  0485                  PUSHAL  NO_READY
         000018C8'EF  DF  048B                  PUSHAL  T_WR_BLK_ERR
                   00  DD  0491                  PUSHL   #0
                   01  DD  0493                  PUSHL   #$ER
                     0495        ;;; TEST 10, SUBTEST 2, ERROR 1
000100D0 9F   04  FB  0495                  CALLS   #$$M, a#DS$ERRHARD
                     049C  4452          $DS_BNCOMPLETE  10$
            03 50  E9  049C                  BLBC    R0, 10$
                     049F  4453          $DS_ABORT       TEST
                   50  D4  049F                  CLRL    R0                 ; SEND A WARNING TO THE SUPERVISOR
                   04  04A1                  RET                        ; TERMINATE TEST
                     04A2  4454 10$:     $DS_ABORT
00010020 9F   6C  FA  04A2                  CALLG   (AP), a#DS$ABORT
                     04A9  4455                                          ; read continue
         00000003'EF  94  04A9  4456 20$:  CLRB    B_COUNT            ; clear counter to send 4 data packets
      54 FFC2F700 8F  D0  04AF  4457 30$:  MOVL    #DELAY_TIME6,R4    ; load receive packet delay time
      55 00000000'FF  9E  04B6  4458       MOVAB   aA_BUFFER_BEGIN,R5 ; load buffer address to store data
         57   55   01  C1  04BD  4459       ADDL3   #1,R5,R7           ; load last expected address of data
```

```
                00002083'EF   16   04C1  4460          JSB     RECEIVE_TU58                    ; go get data from TU58
          5A    00000023'EF   9E   04C7  4461          MOVAB   B_CONTINUE,R10                  ; load address of expected data
          5B    00000000'FF   9E   04CE  4462          MOVAB   aA_BUFFER_BEGIN,R11             ; load address of buffer
                      57  55   D1   04D5  4463          CMPL    R5,R7                           ; check for correct number of bytes
                          2A   13   04D8  4464          BEQL    70$                             ; br = correct number of bytes
                               04DA  4465 35$:     $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=REC_ERR,-
                               04DA  4466                          P1=#T_REC_CONT
                00001D47'8F   DD   04DA                          PUSHL   #T_REC_CONT
                00001EB4'EF   DF   04E0                          PUSHAL  REC_ERR
                000018C8'EF   DF   04E6                          PUSHAL  T_WR_BLK_ERR
                          00  DD   04EC                          PUSHL   #0
                          02  DD   04EE                          PUSHL   #$ER
                              04F0        ;;; TEST 10, SUBTEST 2, ERROR 2
          000100D0 9F     05  FB   04F0                          CALLS   #$$M, a#DS$ERRHARD
                              04F7  4467          $DS_BNCOMPLETE  40$
                       03 50  E9   04F7                          BLBC    R0, 40$
                              04FA  4468          $DS_ABORT       TEST
                          50  D4   04FA                          CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                              04FC                          RET                             ; TERMINATE TEST
                              04FD  4469
                              04FD  4470 40$:     $DS_ABORT
          00010020 9F     6C  FA   04FD                          CALLG   (AP), a#DS$ABORT
                              0504  4471                                                  ; check continue
                       5C 01  D0   0504  4472 70$:     MOVL    #1,R12                          ; load number of bytes to check
                              0507  4473          $DS_BREAK
          00010058 9F     6E  FA   0507                          CALLG   (SP), a#DS$BREAK
                00002138'EF   16   050E  4474          JSB     CHECK_PACKET                    ; go check continue
                              0514  4475          $DS_BNCOMPLETE  90$                             ; br = no error
                       24 50  E9   0514                          BLBC    R0, 90$
                              0517  4476          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=DATA_ERR_CONT
                00001E4D'EF   DF   0517                          PUSHAL  DATA_ERR_CONT
                000018C8'EF   DF   051D                          PUSHAL  T_WR_BLK_ERR
                          00  DD   0523                          PUSHL   #0
                          03  DD   0525                          PUSHL   #$ER
                              0527        ;;; TEST 10, SUBTEST 2, ERROR 3
          000100D0 9F     04  FB   0527                          CALLS   #$$M, a#DS$ERRHARD
                              052E  4477          $DS_BNCOMPLETE  80$
                       03 50  E9   052E                          BLBC    R0, 80$
                              0531  4478          $DS_ABORT       TEST
                          50  D4   0531                          CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                              0533                          RET                             ; TERMINATE TEST
                              0534  4479 80$:     $DS_ABORT
          00010020 9F     6C  FA   0534                          CALLG   (AP), a#DS$ABORT
                              053B  4480                                                  ; send data packet
          54    FFFB6C20 8F   D0   053B  4481 90$:     MOVL    #DELAY_TIME1,R4                 ; load send packet delay time
          55    0000070A'EF   9E   0542  4482          MOVAB   B_DATA_PKT_2,R5                 ; point to data packet
          57    00000084 8F   D0   0549  4483          MOVL    #132,R7                         ; load transfer byte count
                00002041'EF   16   0550  4484          JSB     SEND_TU58                       ; send data packet
     24 00000000'EF     00  E1   0556  4485          BBC     #V_CLOCK_FLAG,B_FLAGS,110$ ; br = no timeout error
                              055E  4486          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=NO_READY
                00001BEB'EF   DF   055E                          PUSHAL  NO_READY
                000018C8'EF   DF   0564                          PUSHAL  T_WR_BLK_ERR
                          00  DD   056A                          PUSHL   #0
                          04  DD   056C                          PUSHL   #$ER
                              056E        ;;; TEST 10, SUBTEST 2, ERROR 4
```

```
000100D0 9F   04   FB  056E                        CALLS   #$$M, @#DS$ERRHARD
                  0575  4487          $DS_BNCOMPLETE  100$
              03 50   E9  0575                      BLBC    R0, 100$
                  0578  4488          $DS_ABORT       TEST
                 50   D4  0578                      CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                      04  057A                      RET                         ; TERMINATE TEST
                  057B  4489 100$:    $DS_ABORT
00010020 9F   6C   FA  057B                        CALLG   (AP), @#DS$ABORT
                  0582  4490
     00000000'FF  94  0582  4491 110$:  CLRB    @A_BUFFER_BEGIN             ; clear buffer location with data
FF1D 00000003'EF  01  03  0588  4492          ACBB    #3,#1,B_COUNT,30$       ; br = not finished
                  0592  4493                                                  ; read end packet
54   FFF3CB00 8F  D0  0592  4494 120$:  MOVL    #DELAY_TIME3,R4             ; load receive packet delay time
55   00000000'FF  9E  0599  4495          MOVAB   @A_BUFFER_BEGIN,R5          ; load buffer address to store data
   57   55   0E  C1  05A0  4496          ADDL3   #14,R5,R7                   ; load last expected address of data
     00002083'EF  16  05A4  4497          JSB     RECEIVE_TU58                ; go get data from TU58
5A   000005FE'EF  9E  05AA  4498          MOVAB   B_END_PACKET_4,R10          ; load address of expected end packet
5B   00000000'FF  9E  05B1  4499          MOVAB   @A_BUFFER_BEGIN,R11         ; load address of actual end packet
        57   55   D1  05B8  4500          CMPL    R5,R7                       ; check for correct number of bytes
             31   13  05BB  4501          BEQL    150$                        ; br = correct number of bytes
00000000'EF   08   88  05BD  4502          BISB2   #M_END_FLAG,B_FLAGS         ; set end error flag
                  05C4  4503 122$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=REC_ERR,-
                  05C4  4504                          P1=#T_REC_END
     00001D2E'8F  DD  05C4                      PUSHL   #T_REC_END
     00001EB4'EF  DF  05CA                      PUSHAL  REC_ERR
     000018C8'EF  DF  05D0                      PUSHAL  T_WR_BLK_ERR
             00   DD  05D6                      PUSHL   #0
             05   DD  05D8                      PUSHL   #$ER
                  05DA      ;;; TEST 10, SUBTEST 2, ERROR 5
000100D0 9F   05   FB  05DA                        CALLS   #$$M, @#DS$ERRHARD
                  05E1  4505          $DS_BNCOMPLETE  125$
              03 50   E9  05E1                      BLBC    R0, 125$
                  05E4  4506          $DS_ABORT       TEST
                 50   D4  05E4                      CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                      04  05E6                      RET                         ; TERMINATE TEST
                  05E7  4507
                  05E7  4508 125$:    $DS_ABORT
00010020 9F   6C   FA  05E7                        CALLG   (AP), @#DS$ABORT
                  05EE  4509                                                  ; check end packet
          5C   0E   D0  05EE  4510 150$:  MOVL    #14,R12                     ; load number of bytes to check
                  05F1  4511          $DS_BREAK
00010058 9F   6E   FA  05F1                        CALLG   (SP), @#DS$BREAK
     0000213B'EF  16  05F8  4512          JSB     CHECK_PACKET                ; go check end packet
                  05FE  4513          $DS_BNCOMPLETE  170$                    ; br = no error
              24 50   E9  05FE                      BLBC    R0, 170$
                  0601  4514          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=DATA_ERR_END
     00001E9D'EF  DF  0601                      PUSHAL  DATA_ERR_END
     000018C8'EF  DF  0607                      PUSHAL  T_WR_BLK_ERR
             00   DD  060D                      PUSHL   #0
             06   DD  060F                      PUSHL   #$ER
                  0611      ;;; TEST 10, SUBTEST 2, ERROR 6
000100D0 9F   04   FB  0611                        CALLS   #$$M, @#DS$ERRHARD
                  0618  4515          $DS_BNCOMPLETE  160$
              03 50   E9  0618                      BLBC    R0, 160$
                  061B  4516          $DS_ABORT       TEST
```

```
                        50   D4  061B                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                             04  061D                        RET                     ; TERMINATE TEST
                                 061E  4517 160$:    $DS_ABORT
            00010020 9F      6C  FA  061E                        CALLG   (AP), a#DS$ABORT
                                 0625  4518 170$:
                                 0625  4519         $DS_ENDSUB
                                 0625       T10_S2_X:
    00010038 9F   00000030'EF    FA  0625                        CALLG   $S$, a#DS$ENDSUB
                                 0630  4520
                                 0630  4521         $DS_PAGE
```

```
0630                    .SBTTL  SUBTEST 10.3:   READ BLOCK
0630  4524 ;*
0630  4525 ; SUBTEST DESCRIPTION:
0630  4526 ;
0630  4527 ;       This subtest sends the TU58 a command packet to read the 512
0630  4528 ;       bytes of data that were written in the previous subtest. A
0630  4529 ;       timer is set which will time out if there is no response from the
0630  4530 ;       TU58 between each byte transaction. The end packet and data packets
0630  4531 ;       are checked for errors. If any errors are encountered they are
0630  4532 ;       reported.
0630  4533 ;
0630  4534 ;
0630  4535 ; SUBTEST STEPS:
0630  4536 ;
0630  4537 ;       SUBTEST READ BLOCK
0630  4538 ;       :  Clear buffer
0630  4539 ;       :  Point to read command packet
0630  4540 ;       :  REPEAT
0630  4541 ;       :  :  Send command packet byte at a time
0630  4542 ;       :  :  Set timer
0630  4543 ;       :  :  IF timer expired and no response
0630  4544 ;       :  :  :  THEN
0630  4545 ;       :  :  :  Report no response error
0630  4546 ;       :  :  :  Exit test
0630  4547 ;       :  :  ENDIF
0630  4548 ;       :  : UNTIL all bytes sent
0630  4549 ;       :  ENDREPEAT
0630  4550 ;       :  REPEAT
0630  4551 ;       :  :  Set timer
0630  4552 ;       :  :  IF timer expired AND done set
0630  4553 ;       :  :  :  THEN
0630  4554 ;       :  :  :  :  Read byte
0630  4555 ;       :  :  ENDIF
0630  4556 ;       :  : UNTIL timer expired AND done clear
0630  4557 ;       :  ENDREPEAT
0630  4558 ;       :  IF expected byte count NEQ actual byte count
0630  4559 ;       :  :  THEN
0630  4560 ;       :  :  :  Report error
0630  4561 ;       :  :  :  Exit test
0630  4562 ;       :  ENDIF
0630  4563 ;       :  REPEAT
0630  4564 ;       :  :  Point to expected data packet
0630  4565 ;       :  :  REPEAT
0630  4566 ;       :  :  :  IF data expected NEQ data received
0630  4567 ;       :  :  :  :  THEN
0630  4568 ;       :  :  :  :  Report data error
0630  4569 ;       :  :  :  :  Exit subtest
0630  4570 ;       :  :  :  ENDIF
0630  4571 ;       :  :  :  Point to next byte of data
0630  4572 ;       :  :  : UNTIL all data in packet checked
0630  4573 ;       :  :  ENDREPEAT
0630  4574 ;       :  : UNTIL 4 data packets checked
0630  4575 ;       :  ENDREPEAT
0630  4576 ;       :  Point to expected end packet
0630  4577 ;       :  REPEAT
```

```
                                0630  4578 ;       :  :  IF data expected NEQ data received
                                0630  4579 ;       :  :  : THEN
                                0630  4580 ;       :  :  : Report data error
                                0630  4581 ;       :  :  : Exit subtest
                                0630  4582 ;       :  :  ENDIF
                                0630  4583 ;       :  : UNTIL all end packet bytes checked
                                0630  4584 ;       :  ENDREPEAT
                                0630  4585 ;       ENDSUBTEST READ BLOCK
                                0630  4586 ;
                                0630  4587 ;
                                0630  4588 ;
                                0630  4589 ;.page
                                0630  4590 ;-
                                0630  4591
                                0630  4592           $DS_BGNSUB
                                0630        T10_S3::
00010030 9F   0000003C'EF   FA  0630                   CALLG   $S$, a#DS$BGNSUB
                                063B  4593                                      ; clear buffers
         00000000'EF   94       063B  4594           CLRB    B_FLAGS            ; initialize flags
      58 00000000'FF   9E       0641  4595           MOVAB   @A_BUFFER_BEGIN,R8 ; load buffer starting address
      59 00000400 8F   D0       0648  4596           MOVL    #1024,R9           ; do two pages
         00002134'EF   16       064F  4597           JSB     CLEAR_BUFFER       ; go clear buffers
                                0655  4598                                      ; send read command
      54 FFF3CB00 8F   D0       0655  4599           MOVL    #DELAY_TIME3,R4    ; load send packet delay time
      55 00000078'EF   9E       065C  4600           MOVAB   B_READ_2_CMD,R5    ; point to read command packet
            57   0E   D0       0663  4601           MOVL    #14,R7             ; load transfer byte count
         0000203D'EF   16       0666  4602           JSB     SEND_TU58          ; send command packet
   24 00000000'EF   00   E1     066C  4603           BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                                0674  4604           $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=NO_READY
         00001BEB'EF   DF       0674                   PUSHAL  NO_READY
         000018EB'EF   DF       067A                   PUSHAL  T_RD_BLK_ERR
                  00   DD       0680                   PUSHL   #0
                  01   DD       0682                   PUSHL   #$ER
                                0684        ;;; TEST 10, SUBTEST 3, ERROR 1
   000100D0 9F   04   FB        0684                   CALLS   #$$M, a#DS$ERRHARD
                                068B  4605           $DS_BNCOMPLETE  1$
               03 50   E9       068B                   BLBC    R0, 1$
                                068E  4606           $DS_ABORT       TEST
                  50   D4       068E                   CLRL    R0                 ; SEND A WARNING TO THE SUPERVISOR
                  04   FB       0690                   RET                        ; TERMINATE TEST
                                0691  4607 1$:       $DS_ABORT
   00010020 9F   6C   FA        0691                   CALLG   (AP), a#DS$ABORT
                                0698  4608                                      ; read data and end packets
   54   FFF3CB00 8F   D0         0698  4609 2$:       MOVL    #DELAY_TIME3,R4    ; load receive packet delay time
   55   00000000'FF   9E         069F  4610           MOVAB   @A_BUFFER_BEGIN,R5 ; load buffer address to store data
57 55   0000021E 8F   C1         06A6  4611           ADDL3   #542,R5,R7         ; load last expected address of data
        00002083'EF   16         06AE  4612           JSB     RECEIVE_TU58       ; go get data from TU58
   5B   00000000'FF   9E         06B4  4613           MOVAB   @A_BUFFER_BEGIN,R11 ; load address of buffer
   5A   0000070A'EF   9E         06BB  4614           MOVAB   B_DATA_PKT_2,R10   ; load address of expected data
           57   55   D1         06C2  4615           CMPL    R5,R7              ; check for correct number of bytes
                31   13         06C5  4616           BEQL    6$                 ; br = correct number of bytes
        00000000'EF   04   88    06C7  4617           BISB2   #M_DATA_FLAG,B_FLAGS ; set data error flag
                                06CE  4618 3$:       $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=REC_ERR,-
                                06CE  4619                           P1=#T_REC_DATA
         00001D68'8F   DD       06CE                   PUSHL   #T_REC_DATA
```

```
                00001EB4'EF   DF  06D4                      PUSHAL  REC_ERR
                000018EB'EF   DF  06DA                      PUSHAL  T_RD_BLK_ERR
                          00  DD  06E0                      PUSHL   #0
                          02  DD  06E2                      PUSHL   #$ER
                              06E4        ;;; TEST 10, SUBTEST 3, ERROR 2
              000100D0 9F   05  FB  06E4                    CALLS   #$$M, a#DS$ERRHARD
                              06EB  4620        $DS_BNCOMPLETE  4$
                       03 50  E9  06EB                    BLBC    R0, 4$
                              06EE  4621        $DS_ABORT       TEST
                          50  D4  06EE                    CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                          04  06F0                    RET                         ; TERMINATE TEST
                              06F1  4622
                              06F1  4623 4$:    $DS_ABORT
              00010020 9F   6C  FA  06F1                    CALLG   (AP), a#DS$ABORT
                              06F8  4624                                          ; check data packets
                00000006'EF   D4  06F8  4625 6$:  CLRL    L_COUNT                 ; clear counter to check 4 packets
           5C   00000084 8F   D0  06FE  4626       MOVL    #132,R12                ; load number of bytes to check
                              0705  4627 7$:    $DS_BREAK
              00010058 9F   6E  FA  0705                    CALLG   (SP), a#DS$BREAK
                0000213B'EF   16  070C  4628        JSB     CHECK_PACKET            ; go check data packet
                              0712  4629        $DS_BNCOMPLETE  9$                  ; br = no error
                       24 50  E9  0712                    BLBC    R0, 9$
                              0715  4630        $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=DATA_ERR_DATA
                00001E75'EF   DF  0715                    PUSHAL  DATA_ERR_DATA
                000018EB'EF   DF  071B                    PUSHAL  T_RD_BLK_ERR
                          00  DD  0721                    PUSHL   #0
                          03  DD  0723                    PUSHL   #$ER
                              0725        ;;; TEST 10, SUBTEST 3, ERROR 3
              000100D0 9F   04  FB  0725                    CALLS   #$$M, a#DS$ERRHARD
                              072C  4631        $DS_BNCOMPLETE  8$
                       03 50  E9  072C                    BLBC    R0, 8$
                              072F  4632        $DS_ABORT       TEST
                          50  D4  072F                    CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                          04  0731                    RET                         ; TERMINATE TEST
                              0732  4633 8$:    $DS_ABORT
              00010020 9F   6C  FA  0732                    CALLG   (AP), a#DS$ABORT
           5B   00000084 8F   C0  0739  4634 9$:  ADDL2   #132,R11                 ; adjust pointer to next packet
        BD 00000006'EF   03  F3  0740  4635       AOBLEQ  #3,L_COUNT,7$           ; br = not finished checking data
                              0748  4636                                          ; check end packet
           5A   000005FE'EF   9E  0748  4637       MOVAB   B_END_PACKET_4,R10      ; load address of expected end packet
                     5C   0E  D0  074F  4638       MOVL    #14,R12                 ; load number of bytes to check
                              0752  4639        $DS_BREAK
              00010058 9F   6E  FA  0752                    CALLG   (SP), a#DS$BREAK
                0000213B'EF   16  0759  4640        JSB     CHECK_PACKET            ; go check end packet
                              075F  4641        $DS_BNCOMPLETE  11$                 ; br = no error
                       24 50  E9  075F                    BLBC    R0, 11$
                              0762  4642        $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=DATA_ERR_END
                00001E9D'EF   DF  0762                    PUSHAL  DATA_ERR_END
                000018EB'EF   DF  0768                    PUSHAL  T_RD_BLK_ERR
                          00  DD  076E                    PUSHL   #0
                          04  DD  0770                    PUSHL   #$ER
                              0772        ;;; TEST 10, SUBTEST 3, ERROR 4
              000100D0 9F   04  FB  0772                    CALLS   #$$M, a#DS$ERRHARD
                              0779  4643        $DS_BCOMPLETE   10$
                       03 50  E8  0779                    BLBS    R0, 10$
```

```
                                077C  4644          $DS_ABORT       TEST
                        50   D4  077C                      CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                             04  077E                      RET                     ; TERMINATE TEST
                                077F  4645 10$:     $DS_ABORT
          00010020 9F   6C   FA  077F                      CALLG   (AP), a#DS$ABORT
                                0786  4646 11$:
                                0786  4647
                                0786  4648          $DS_ENDSUB
                                0786        T10_S3_X:
    00010038 9F   0000003C'EF   FA  0786                      CALLG   $S$, a#DS$ENDSUB
                                0791  4649
                                0791  4650          $DS_PAGE
```

```
0791                    .SBTTL  SUBTEST 10.4:   WRITE MODIFIED
0791  4653 ;+
0791  4654 ; SUBTEST DESCRIPTION:
0791  4655 ;
0791  4656 ;       This subtest sends the TU58 a command packet to write modified
0791  4657 ;       512 bytes of data. A timer is set which will time out if a
0791  4658 ;       response is not received within the allotted time on all byte
0791  4659 ;       transactions between the host and TU58. Four 128 byte data packets
0791  4660 ;       are sent. Before each data packet is sent a continue is read from the
0791  4661 ;       TU58 and when all data has been sent the end packet is read from the
0791  4662 ;       TU58 and checked. If any errors are encountered they are reported.
0791  4663 ;       This modified command will write all of the data and then back up and
0791  4664 ;       check the checksum for data just written.
0791  4665 ;
0791  4666 ;
0791  4667 ; SUBTEST STEPS:
0791  4668 ;
0791  4669 ;       SUBTEST WRITE MODIFIED
0791  4670 ;       : Clear buffer
0791  4671 ;       : Point to write command packet
0791  4672 ;       : REPEAT
0791  4673 ;       : : Send command packet byte at a time
0791  4674 ;       : : Set timer
0791  4675 ;       : : IF timer expired AND no response
0791  4676 ;       : : : THEN
0791  4677 ;       : : : Report no response error
0791  4678 ;       : : : Exit test
0791  4679 ;       : : ENDIF
0791  4680 ;       : : UNTIL all bytes sent
0791  4681 ;       : ENDREPEAT
0791  4682 ;       : DO for count = 1 to 4
0791  4683 ;       : : Wait for continue
0791  4684 ;       : : Set timer
0791  4685 ;       : : IF timer expired AND no continue
0791  4686 ;       : : : THEN
0791  4687 ;       : : : Report no continue error
0791  4688 ;       : : : Exit test
0791  4689 ;       : : ENDIF
0791  4690 ;       : : Point to data packet
0791  4691 ;       : : REPEAT
0791  4692 ;       : : : Send data packet byte at a time
0791  4693 ;       : : : Set timer
0791  4694 ;       : : : IF timer expired AND no response
0791  4695 ;       : : : : THEN
0791  4696 ;       : : : : Report no response error
0791  4697 ;       : : : : Exit test
0791  4698 ;       : : : ENDIF
0791  4699 ;       : : : UNTIL all bytes sent
0791  4700 ;       : : ENDREPEAT
0791  4701 ;       : ENDDO
0791  4702 ;       : REPEAT
0791  4703 ;       : : Set timer
0791  4704 ;       : : IF timer expired AND done set
0791  4705 ;       : : : THEN
0791  4706 ;       : : : : Read byte
```

```
                                0791  4707 ;       :  : ENDIF
                                0791  4708 ;       :  : UNTIL timer expired AND done clear
                                0791  4709 ;       :  ENDREPEAT
                                0791  4710 ;       :  IF expected byte count NEQ actual byte count
                                0791  4711 ;       :  : THEN
                                0791  4712 ;       :  : : Report error
                                0791  4713 ;       :  : : Exit test
                                0791  4714 ;       :  ENDIF
                                0791  4715 ;       :  Point to expected end packet
                                0791  4716 ;       :  REPEAT
                                0791  4717 ;       :  : IF expected end packet data NEQ received end packet data
                                0791  4718 ;       :  : : THEN
                                0791  4719 ;       :  : : Report end packet data error
                                0791  4720 ;       :  : ENDIF
                                0791  4721 ;       :  : UNTIL all data checked
                                0791  4722 ;       :  ENDREPEAT
                                0791  4723 ;       ENDSUBTEST WRITE MODIFIED
                                0791  4724 ;
                                0791  4725 ;
                                0791  4726 ;.page
                                0791  4727 ;-
                                0791  4728         $DS_BGNSUB
                                0791          T10_S4::
00010030 9F   00000048'EF   FA  0791                  CALLG   $S$, a#DS$BGNSUB
                                079C  4729                                    ; clear buffers
         00000000'EF        94  079C  4730          CLRB    B_FLAGS          ; initialize flags
      58 00000000'FF        9E  07A2  4731          MOVAB   @A_BUFFER_BEGIN,R8 ; load buffer starting address
      59 00000400 8F        D0  07A9  4732          MOVL    #1024,R9         ; do two pages
         00002134'EF        16  07B0  4733          JSB     CLEAR_BUFFER     ; go clear buffers
                                07B6  4734                                    ; send write command
      54 FFF3CB00 8F        D0  07B6  4735          MOVL    #DELAY_TIME3,R4  ; load send packet delay time
      55 000000A2'EF        9E  07BD  4736          MOVAB   B_WRITE_4_CMD,R5 ; point to write command packet
            57   0E        D0  07C4  4737          MOVL    #14,R7           ; load transfer byte count
         0000203D'EF        16  07C7  4738          JSB     SEND_TU58        ; send command packet
24 00000000'EF   00        E1  07CD  4739          BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                                07D5  4740          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_MOD_ERR,PRLINK=NO_READY
         00001BEB'EF        DF  07D5                      PUSHAL  NO_READY
         00001954'EF        DF  07DB                      PUSHAL  T_WR_MOD_ERR
                   00       DD  07E1                      PUSHL   #0
                   01       DD  07E3                      PUSHL   #$ER
                                07E5              ;;; TEST 10, SUBTEST 4, ERROR 1
000100D0 9F      04        FB  07E5                      CALLS   #$$M, a#DS$ERRHARD
                                07EC  4741          $DS_BNCOMPLETE  1$
               03 50        E9  07EC                      BLBC    R0, 1$
                                07EF  4742          $DS_ABORT       TEST
                   50       D4  07EF                      CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                            04  07F1                      RET                      ; TERMINATE TEST
                                07F2  4743 1$:      $DS_ABORT
00010020 9F      6C        FA  07F2                      CALLG   (AP), a#DS$ABORT
                                07F9  4744                                    ; read continue
         00000003'EF        94  07F9  4745 2$:      CLRB    B_COUNT          ; clear counter to send 4 data packets
      54 FFF3CB00 8F        D0  07FF  4746 3$:      MOVL    #DELAY_TIME3,R4  ; load receive packet delay time
      55 00000000'FF        9E  0806  4747          MOVAB   @A_BUFFER_BEGIN,R5 ; load buffer address to store data
         57   55   01        C1  080D  4748          ADDL3   #1,R5,R7         ; load last expected address of data
         00002083'EF        16  0811  4749          JSB     RECEIVE_TU58     ; go get data from TU58
```

```
                5A   00000023'EF   9E  0817  4750          MOVAB   B_CONTINUE,R10           ; load address of expected data
                5B   00000000'FF   9E  081E  4751          MOVAB   @A_BUFFER_BEGIN,R11      ; load address of actual data
                     57    55      D1  0825  4752          CMPL    R5,R7                    ; check for correct number of byte
                           2A      13  0828  4753          BEQL    7$                       ; br = correct number of bytes
                                       082A  4754 4$:       $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_MOD_ERR,PRLINK=REC_ERR,-
                                       082A  4755                           P1=#T_REC_CONT
                     00001D47'8F       DD  082A                           PUSHL   #T_REC_CONT
                     00001EB4'EF       DF  0830                           PUSHAL  REC_ERR
                     00001954'EF       DF  0836                           PUSHAL  T_WR_MOD_ERR
                                 00    DD  083C                           PUSHL   #0
                                 02    DD  083E                           PUSHL   #$ER
                                       0840          ;;; TEST 10, SUBTEST 4, ERROR 2
                000100D0 9F      05   FB  0840                           CALLS   #$$M, @#DS$ERRHARD
                                       0847  4756          $DS_BNCOMPLETE  5$
                           03 50       E9  0847                           BLBC    R0, 5$
                                       084A  4757          $DS_ABORT       TEST
                                 50    D4  084A                           CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                                 04    084C                               RET                      ; TERMINATE TEST
                                       084D  4758
                                       084D  4759 5$:       $DS_ABORT
                00010020 9F      6C   FA  084D                           CALLG   (AP), @#DS$ABORT
                                       0854  4760                                                ; check continue
                           5C    01    D0  0854  4761 7$:       MOVL    #1,R12                   ; load number of bytes to check
                                       0857  4762          $DS_BREAK
                00010058 9F      6E   FA  0857                           CALLG   (SP), @#DS$BREAK
                     0000213B'EF       16  085E  4763          JSB     CHECK_PACKET             ; go check continue
                                       0864  4764          $DS_BNCOMPLETE  9$                   ; br = no error
                           24 50       E9  0864                           BLBC    R0, 9$
                                       0867  4765          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_MOD_ERR,PRLINK=DATA_ERR_CONT
                     00001E4D'EF       DF  0867                           PUSHAL  DATA_ERR_CONT
                     00001954'EF       DF  086D                           PUSHAL  T_WR_MOD_ERR
                                 00    DD  0873                           PUSHL   #0
                                 03    DD  0875                           PUSHL   #$ER
                                       0877          ;;; TEST 10, SUBTEST 4, ERROR 3
                000100D0 9F      04   FB  0877                           CALLS   #$$M, @#DS$ERRHARD
                                       087E  4766          $DS_BNCOMPLETE  8$
                           03 50       E9  087E                           BLBC    R0, 8$
                                       0881  4767          $DS_ABORT       TEST
                                 50    D4  0881                           CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                                 04    0883                               RET                      ; TERMINATE TEST
                                       0884  4768 8$:       $DS_ABORT
                00010020 9F      6C   FA  0884                           CALLG   (AP), @#DS$ABORT
                                       088B  4769                                                ; send data packet
                54   FFFB6C20 8F       D0  088B  4770 9$:       MOVL    #DELAY_TIME1,R4          ; load send packet delay time
                55   0000070A'EF       9E  0892  4771          MOVAB   B_DATA_PKT_2,R5          ; point to data packet
                57   00000084 8F       D0  0899  4772          MOVL    #132,R7                  ; load transfer byte count
                     0000203D'EF       16  08A0  4773          JSB     SEND_TU58                ; send data packet
           24 00000000'EF          00   E1  08A6  4774          BBC     #V_CLOCK_FLAG,B_FLAGS,11$ ; br = no timeout error
                                       08AE  4775          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_MOD_ERR,PRLINK=NO_READY
                     00001BEB'EF       DF  08AE                           PUSHAL  NO_READY
                     00001954'EF       DF  08B4                           PUSHAL  T_WR_MOD_ERR
                                 00    DD  08BA                           PUSHL   #0
                                 04    DD  08BC                           PUSHL   #$ER
                                       08BE          ;;; TEST 10, SUBTEST 4, ERROR 4
                000100D0 9F      04   FB  08BE                           CALLS   #$$M, @#DS$ERRHARD
```

```
                                  08C5  4776          $DS_BNCOMPLETE  10$
                     03 50   E9   08C5                        BLBC    R0, 10$
                                  08C8  4777          $DS_ABORT       TEST
                        50   D4   08C8                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                             04   08CA                        RET                         ; TERMINATE TEST
                                  08CB  4778 10$:     $DS_ABORT
          00010020 9F   6C   FA   08CB                        CALLG   (AP), @#DS$ABORT
               00000000'FF   94   08D2  4779 11$:     CLRB    @A_BUFFER_BEGIN             ; clear buffer location used for data
   FF1D 00000003'EF   01   03   9D   08D8  4780          ACBB    #3,#1,B_COUNT,3$            ; br = not finished
                                  08E2  4781                                              ; read end packet
          54   FFE17B80 8F   D0   08E2  4782          MOVL    #DELAY_TIME5,R4             ; load receive packet delay time
          55   00000000'FF   9E   08E9  4783          MOVAB   @A_BUFFER_BEGIN,R5          ; load buffer address to store data
              57   55   0E   C1   08F0  4784          ADDL3   #14,R5,R7                   ; load last expected address of data
               00002083'EF   16   08F4  4785          JSB     RECEIVE_TU58                ; go get data from TU58
          5A   000005FE'EF   9E   08FA  4786          MOVAB   B_END_PACKET_4,R10          ; load address of expected end packet
          5B   00000000'FF   9E   0901  4787          MOVAB   @A_BUFFER_BEGIN,R11         ; load address of actual end packet
                   57   55   D1   0908  4788          CMPL    R5,R7                       ; check for correct number of bytes
                        31   13   090B  4789          BEQL    15$                         ; br = correct number of bytes
          00000000'EF   08   88   090D  4790          BISB2   #M_END_FLAG,B_FLAGS         ; set end error flag
                                  0914  4791 12$:     $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_MOD_ERR,PRLINK=REC_ERR,-
                                  0914  4792                          P1=#T_REC_END
               00001D2E'8F   DD   0914                        PUSHL   #T_REC_END
               00001EB4'EF   DF   091A                        PUSHAL  REC_ERR
               00001954'EF   DF   0920                        PUSHAL  T_WR_MOD_ERR
                        00   DD   0926                        PUSHL   #0
                        05   DD   0928                        PUSHL   #$ER
                                  092A        ;;; TEST 10, SUBTEST 4, ERROR 5
          000100D0 9F   05   FB   092A                        CALLS   #$$M, @#DS$ERRHARD
                                  0931  4793          $DS_BNCOMPLETE  13$
                     03 50   E9   0931                        BLBC    R0, 13$
                                  0934  4794          $DS_ABORT       TEST
                        50   D4   0934                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                             04   0936                        RET                         ; TERMINATE TEST
                                  0937  4795
                                  0937  4796 13$:     $DS_ABORT
          00010020 9F   6C   FA   0937                        CALLG   (AP), @#DS$ABORT
                                  093E  4797                                              ; check end packet
                   5C   0E   D0   093E  4798 15$:     MOVL    #14,R12                     ; load number of bytes to check
                                  0941  4799          $DS_BREAK
          00010058 9F   6E   FA   0941                        CALLG   (SP), @#DS$BREAK
               0000213B'EF   16   0948  4800          JSB     CHECK_PACKET                ; go check end packet
                                  094E  4801          $DS_BNCOMPLETE  17$                 ; br = no error
                     24 50   E9   094E                        BLBC    R0, 17$
                                  0951  4802          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_MOD_ERR,PRLINK=DATA_ERR_END
               00001E9D'EF   DF   0951                        PUSHAL  DATA_ERR_END
               00001954'EF   DF   0957                        PUSHAL  T_WR_MOD_ERR
                        00   DD   095D                        PUSHL   #0
                        06   DD   095F                        PUSHL   #$ER
                                  0961        ;;; TEST 10, SUBTEST 4, ERROR 6
          000100D0 9F   04   FB   0961                        CALLS   #$$M, @#DS$ERRHARD
                                  0968  4803          $DS_BNCOMPLETE  16$
                     03 50   E9   0968                        BLBC    R0, 16$
                                  096B  4804          $DS_ABORT       TEST
                        50   D4   096B                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                             04   096D                        RET                         ; TERMINATE TEST
```

```
                          096E  4805 16$:    $DS_ABORT
            00010020 9F   6C    FA 096E                 CALLG   (AP), a#DS$ABORT
                          0975  4806 17$:
                          0975  4807        $DS_ENDSUB
                          0975       T10_S4_X:
    00010038 9F   00000048'EF   FA 0975                 CALLG   $S$, a#DS$ENDSUB
                          0980  4808
                          0980  4809        $DS_PAGE
```

```
                        .SBTTL  SUBTEST 10.5:   READ MODIFIED
0980  4812 ;+
0980  4813 ; SUBTEST DESCRIPTION:
0980  4814 ;
0980  4815 ;       This subtest sends the TU58 a command packet to read modified
0980  4816 ;       the 512 bytes of data written in the previous subtest. This
0980  4817 ;       command will cause the TU58 to read the tape with an
0980  4818 ;       increased threshold. A timer is set which will time out if there
0980  4819 ;       is no response within the allotted time. After reading the first
0980  4820 ;       byte of data, another timer is set which will time out if an end
0980  4821 ;       packet is not received within the allotted time. If any data or
0980  4822 ;       timer errors are encountered, they are reported.
0980  4823 ;
0980  4824 ;
0980  4825 ; SUBTEST STEPS:
0980  4826 ;
0980  4827 ;       SUBTEST READ MODIFIED
0980  4828 ;       : Clear buffer
0980  4829 ;       : Point to read command packet
0980  4830 ;       : REPEAT
0980  4831 ;       : : Send command packet byte at a time
0980  4832 ;       : : Set timer
0980  4833 ;       : : IF timer expired and no response
0980  4834 ;       : : : THEN
0980  4835 ;       : : : Report no response error
0980  4836 ;       : : : Exit test
0980  4837 ;       : : ENDIF
0980  4838 ;       : : UNTIL all bytes sent
0980  4839 ;       : ENDREPEAT
0980  4840 ;       : REPEAT
0980  4841 ;       : : Set timer
0980  4842 ;       : : IF timer expired AND done set
0980  4843 ;       : : : THEN
0980  4844 ;       : : : : Read byte
0980  4845 ;       : : ENDIF
0980  4846 ;       : : UNTIL timer expired AND done clear
0980  4847 ;       : ENDREPEAT
0980  4848 ;       : IF expected byte count NEQ actual byte count
0980  4849 ;       : : THEN
0980  4850 ;       : : : Report error
0980  4851 ;       : : : Exit test
0980  4852 ;       : ENDIF
0980  4853 ;       : REPEAT
0980  4854 ;       : : Point to expected data packet
0980  4855 ;       : : REPEAT
0980  4856 ;       : : : IF data expected NEQ data received
0980  4857 ;       : : : : THEN
0980  4858 ;       : : : : Report data error
0980  4859 ;       : : : : Exit subtest
0980  4860 ;       : : : ENDIF
0980  4861 ;       : : : Point to next byte of data
0980  4862 ;       : : : UNTIL all data in packet checked
0980  4863 ;       : : ENDREPEAT
0980  4864 ;       : : UNTIL 4 data packets checked
0980  4865 ;       : ENDREPEAT
```

```
                                0980  4866 ;       :  Point to expected end packet
                                0980  4867 ;       :  REPEAT
                                0980  4868 ;       :  :  IF end packet data expected NEQ end packet data received
                                0980  4869 ;       :  :  :  THEN
                                0980  4870 ;       :  :  :  Report end packet data error
                                0980  4871 ;       :  :  :  Exit subtest
                                0980  4872 ;       :  :  ENDIF
                                0980  4873 ;       :  : UNTIL all end packet bytes checked
                                0980  4874 ;       :  ENDREPEAT
                                0980  4875 ;       ENDSUBTEST READ MODIFIED
                                0980  4876 ;
                                0980  4877 ;
                                0980  4878 ;
                                0980  4879 ;.page
                                0980  4880 ;-
                                0980  4881          $DS_BGNSUB
                                0980         T10_S5::
    00010030 9F   00000054'EF   FA  0980                  CALLG   $S$, a#DS$BGNSUB
                                    098B  4882                                    ; clear buffers
             00000000'EF   94   098B  4883          CLRB    B_FLAGS                ; initialize flags
          58 00000000'FF   9E   0991  4884          MOVAB   aA_BUFFER_BEGIN,R8     ; load buffer starting address
          59 00000400 8F   D0   0998  4885          MOVL    #1024,R9               ; do two pages
             00002134'EF   16   099F  4886          JSB     CLEAR_BUFFER           ; go clear buffers
                                09A5  4887                                         ; send read command
          54 FFF3CB00 8F   D0   09A5  4888          MOVL    #DELAY_TIME3,R4        ; load send packet delay time
          55 000000B0'EF   9E   09AC  4889          MOVAB   B_READ_4_CMD,R5        ; point to read command packet
                57   0E   D0   09B3  4890          MOVL    #14,R7                 ; load transfer byte count
             0000203D'EF   16   09B6  4891          JSB     SEND_TU58              ; send command packet
       24 00000000'EF   00   E1   09BC  4892          BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                                09C4  4893          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_MOD_ERR,PRLINK=NO_READY
             00001BEB'EF   DF   09C4                        PUSHAL  NO_READY
             0000197A'EF   DF   09CA                        PUSHAL  T_RD_MOD_ERR
                      00   DD   09D0                        PUSHL   #0
                      01   DD   09D2                        PUSHL   #$ER
                                09D4         ;;; TEST 10, SUBTEST 5, ERROR 1
          000100D0 9F   04   FB   09D4                     CALLS   #$$M, a#DS$ERRHARD
                                09DB  4894          $DS_BNCOMPLETE  1$
                   03 50   E9   09DB                     BLBC    R0, 1$
                                09DE  4895          $DS_ABORT       TEST
                      50   D4   09DE                     CLRL    R0                ; SEND A WARNING TO THE SUPERVISOR
                      04   09E0                          RET                       ; TERMINATE TEST
                                09E1  4896 1$:      $DS_ABORT
          00010020 9F   6C   FA   09E1                     CALLG   (AP), a#DS$ABORT
                                09E8  4897                                         ; read data and end packet
          54   FFF3CB00 8F   D0   09E8  4898 2$:      MOVL    #DELAY_TIME3,R4        ; load receive packet delay time
          55   00000000'FF   9E   09EF  4899          MOVAB   aA_BUFFER_BEGIN,R5     ; load buffer address to store data
    57    55   0000021E 8F   C1   09F6  4900          ADDL3   #542,R5,R7             ; load last expected address of data
             00002083'EF   16   09FE  4901          JSB     RECEIVE_TU58           ; go get data from TU58
          5B   00000000'FF   9E   0A04  4902          MOVAB   aA_BUFFER_BEGIN,R11    ; load address of actual data
          5A   0000070A'EF   9E   0A0B  4903          MOVAB   B_DATA_PKT_2,R10       ; load address of expected data
                57   55   D1   0A12  4904          CMPL    R5,R7                  ; check for correct number of bytes
                      31   13   0A15  4905          BEQL    6$                     ; br = correct number of bytes
             00000000'EF   04   88   0A17  4906          BISB2   #M_DATA_FLAG,B_FLAGS    ; set data error flag
                                0A1E  4907 3$:      $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_MOD_ERR,PRLINK=REC_ERR,-
                                0A1E  4908                          P1=#T_REC_DATA
```

```
                00001D68'8F    DD  0A1E                      PUSHL   #T_REC_DATA
                00001EB4'EF    DF  0A24                      PUSHAL  REC_ERR
                0000197A'EF    DF  0A2A                      PUSHAL  T_RD_MOD_ERR
                          00   DD  0A30                      PUSHL   #0
                          02   DD  0A32                      PUSHL   #$ER
                               0A34          ;;; TEST 10, SUBTEST 5, ERROR 2
      000100D0 9F         05   FB  0A34                      CALLS   #$$M, a#DS$ERRHARD
                               0A3B  4909          $DS_BNCOMPLETE  4$
                       03 50   E9  0A3B                      BLBC    R0, 4$
                               0A3E  4910          $DS_ABORT       TEST
                          50   D4  0A3E                      CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                          04   0A40                      RET                         ; TERMINATE TEST
                               0A41  4911
                               0A41  4912 4$:      $DS_ABORT
      00010020 9F         6C   FA  0A41                      CALLG   (AP), a#DS$ABORT
                               0A48  4913                                              ; check data packets
                00000006'EF    D4  0A48  4914 6$:      CLRL    L_COUNT                 ; clear counter to check 4 packets
      5C        00000084 8F    D0  0A4E  4915          MOVL    #132,R12                ; load number of bytes to check
                               0A55  4916 7$:      $DS_BREAK
      00010058 9F         6E   FA  0A55                      CALLG   (SP), a#DS$BREAK
                0000213B'EF    16  0A5C  4917          JSB     CHECK_PACKET            ; go check data packet
                               0A62  4918          $DS_BNCOMPLETE  9$                  ; br = no error
                       24 50   E9  0A62                      BLBC    R0, 9$
                               0A65  4919          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_MOD_ERR,PRLINK=DATA_ERR_DATA
                00001E75'EF    DF  0A65                      PUSHAL  DATA_ERR_DATA
                0000197A'EF    DF  0A6B                      PUSHAL  T_RD_MOD_ERR
                          00   DD  0A71                      PUSHL   #0
                          03   DD  0A73                      PUSHL   #$ER
                               0A75          ;;; TEST 10, SUBTEST 5, ERROR 3
      000100D0 9F         04   FB  0A75                      CALLS   #$$M, a#DS$ERRHARD
                               0A7C  4920          $DS_BNCOMPLETE  8$
                       03 50   E9  0A7C                      BLBC    R0, 8$
                               0A7F  4921          $DS_ABORT       TEST
                          50   D4  0A7F                      CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                          04   0A81                      RET                         ; TERMINATE TEST
                               0A82  4922 8$:      $DS_ABORT
      00010020 9F         6C   FA  0A82                      CALLG   (AP), a#DS$ABORT
      5B        00000084 8F    C0  0A89  4923 9$:      ADDL2   #132,R11                ; adjust pointer to next packet
BD    00000006'EF          03   F3  0A90  4924          AOBLEQ  #3,L_COUNT,7$           ; br = not finished checking data
                               0A98  4925                                              ; check end packet
      5A        000005FE'EF    9E  0A98  4926          MOVAB   B_END_PACKET_4,R10      ; load address of expected end packet
                      5C       0E  D0  0A9F  4927          MOVL    #14,R12             ; load number of bytes to check
                               0AA2  4928          $DS_BREAK
      00010058 9F         6E   FA  0AA2                      CALLG   (SP), a#DS$BREAK
                0000213B'EF    16  0AA9  4929          JSB     CHECK_PACKET            ; go check end packet
                               0AAF  4930          $DS_BNCOMPLETE  11$                 ; br = no error
                       24 50   E9  0AAF                      BLBC    R0, 11$
                               0AB2  4931          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_MOD_ERR,PRLINK=DATA_ERR_END
                00001E9D'EF    DF  0AB2                      PUSHAL  DATA_ERR_END
                0000197A'EF    DF  0AB8                      PUSHAL  T_RD_MOD_ERR
                          00   DD  0ABE                      PUSHL   #0
                          04   DD  0AC0                      PUSHL   #$ER
                               0AC2          ;;; TEST 10, SUBTEST 5, ERROR 4
      000100D0 9F         04   FB  0AC2                      CALLS   #$$M, a#DS$ERRHARD
                               0AC9  4932          $DS_BNCOMPLETE  10$
```

```
                      03 50    E9  0AC9                        BLBC    R0, 10$
                                   0ACC  4933          $DS_ABORT       TEST
                         50    D4  0ACC                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                               04  0ACE                        RET                     ; TERMINATE TEST
                                   0ACF  4934 10$:     $DS_ABORT
          00010020 9F    6C    FA  0ACF                        CALLG   (AP), a#DS$ABORT
                                   0AD6  4935 11$:     $DS_ENDSUB
                                   0AD6       T10_S5_X:
    00010038 9F    00000054'EF    FA  0AD6                        CALLG   $S$, a#DS$ENDSUB
                                   0AE1  4936          $DS_PAGE
```

```
0AE1                    .SBTTL  SUBTEST 10.6:   WRITE RECORD
0AE1  4939 ;+
0AE1  4940 ; SUBTEST DESCRIPTION:
0AE1  4941 ;
0AE1  4942 ;       This subtest sends the TU58 a command packet to write one record
0AE1  4943 ;       with 128 bytes of data. A continue flag is returned and the
0AE1  4944 ;       data packet is sent. All byte transactions between the host and
0AE1  4945 ;       TU58 are timed and will timeout if there is no response within
0AE1  4946 ;       the allotted time. If a timer expires while expecting a data
0AE1  4947 ;       transfer to occur, an error is reported. The data packet
0AE1  4948 ;       contains alternating bytes of all one's and all zero's. Both
0AE1  4949 ;       end and data packets are checked and if any errors have occured,
0AE1  4950 ;       they are reported.
0AE1  4951 ;
0AE1  4952 ;
0AE1  4953 ; SUBTEST STEPS:
0AE1  4954 ;
0AE1  4955 ;       SUBTEST WRITE RECORD
0AE1  4956 ;       :  Clear buffer
0AE1  4957 ;       :  Point to write command packet
0AE1  4958 ;       :  REPEAT
0AE1  4959 ;       :  :  Send command packet byte at a time
0AE1  4960 ;       :  :  Set timer
0AE1  4961 ;       :  :  IF timer expired AND no response
0AE1  4962 ;       :  :  :  THEN
0AE1  4963 ;       :  :  :  Report no response error
0AE1  4964 ;       :  :  :  Exit test
0AE1  4965 ;       :  :  ENDIF
0AE1  4966 ;       :  : UNTIL all bytes sent
0AE1  4967 ;       :  ENDREPEAT
0AE1  4968 ;       :  Wait for continue
0AE1  4969 ;       :  Set timer
0AE1  4970 ;       :  IF timer expired AND no continue
0AE1  4971 ;       :  :  THEN
0AE1  4972 ;       :  :  Report no continue error
0AE1  4973 ;       :  :  Exit test
0AE1  4974 ;       :  ENDIF
0AE1  4975 ;       :  Point to data packet
0AE1  4976 ;       :  REPEAT
0AE1  4977 ;       :  :  Send data packet byte at a time
0AE1  4978 ;       :  :  Set timer
0AE1  4979 ;       :  :  IF timer expired AND no response
0AE1  4980 ;       :  :  :  THEN
0AE1  4981 ;       :  :  :  Report no response error
0AE1  4982 ;       :  :  :  Exit test
0AE1  4983 ;       :  :  ENDIF
0AE1  4984 ;       :  : UNTIL all bytes sent
0AE1  4985 ;       :  ENDREPEAT
0AE1  4986 ;       :  REPEAT
0AE1  4987 ;       :  :  Set timer
0AE1  4988 ;       :  :  IF timer expired AND done set
0AE1  4989 ;       :  :  :  THEN
0AE1  4990 ;       :  :  :  :  Read byte
0AE1  4991 ;       :  :  ENDIF
0AE1  4992 ;       :  : UNTIL timer expired AND done clear
```

```
                                0AE1  4993 ;       :  ENDREPEAT
                                0AE1  4994 ;       :  IF expected byte count NEQ actual byte count
                                0AE1  4995 ;       :  : THEN
                                0AE1  4996 ;       :  :  : Report error
                                0AE1  4997 ;       :  :  : Exit test
                                0AE1  4998 ;       :  ENDIF
                                0AE1  4999 ;       :  REPEAT
                                0AE1  5000 ;       :  :  Point to expected end packet
                                0AE1  5001 ;       :  :  IF expected end packet data NEQ received end packet data
                                0AE1  5002 ;       :  :  : THEN
                                0AE1  5003 ;       :  :  :  Report end packet data error
                                0AE1  5004 ;       :  :  ENDIF
                                0AE1  5005 ;       :  : UNTIL all data checked
                                0AE1  5006 ;       :  ENDREPEAT
                                0AE1  5007 ;       ENDSUBTEST WRITE RECORD
                                0AE1  5008 ;
                                0AE1  5009 ;
                                0AE1  5010 ;
                                0AE1  5011 ;.page
                                0AE1  5012 ;-
                                0AE1  5013
                                0AE1  5014         $DS_BGNSUB
                                0AE1       T10_S6::
    00010030 9F   00000060'EF   FA  0AE1                CALLG   $S$, a#DS$BGNSUB
                  00000000'EF   94  0AEC  5015          CLRB    B_FLAGS                 ; initialize flags
                  00000002'EF   94  0AF2  5016          CLRB    B_FLAGS3
                                0AF8  5017                                            ; clear buffers
             58   00000000'FF   9E  0AF8  5018          MOVAB   aA_BUFFER_BEGIN,R8      ; load buffer starting address
             59   00000400 8F   D0  0AFF  5019          MOVL    #1024,R9                ; do two pages
                  00002134'EF   16  0B06  5020          JSB     CLEAR_BUFFER            ; go clear buffers
                                0B0C  5021                                            ; send write command
             54   FFE17B80 8F   D0  0B0C  5022          MOVL    #DELAY_TIME5,R4         ; load send packet delay time
             55   00000086'EF   9E  0B13  5023          MOVAB   B_WRITE_3_CMD,R5        ; point to write command packet
                     57    0E   D0  0B1A  5024          MOVL    #14,R7                  ; load transfer byte count
                  0000203D'EF   16  0B1D  5025          JSB     SEND_TU58               ; send command packet
    24 00000000'EF    00   E1  0B23  5026          BBC     #V_CLOCK_FLAG,B_FLAGS,20$ ; br = no timeout error
                                0B2B  5027          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
                  00001BEB'EF   DF  0B2B                      PUSHAL  NO_READY
                  0000190D'EF   DF  0B31                      PUSHAL  T_WR_REC_ERR
                           00   DD  0B37                      PUSHL   #0
                           01   DD  0B39                      PUSHL   #$ER
                                0B3B       ;;; TEST 10, SUBTEST 6, ERROR 1
    000100D0 9F    04   FB  0B3B                      CALLS   #$$M, a#DS$ERRHARD
                                0B42  5028          $DS_BNCOMPLETE  10$
                        03 50   E9  0B42                      BLBC    R0, 10$
                                0B45  5029          $DS_ABORT       TEST
                           50   D4  0B45                      CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                           04   0B47                      RET                     ; TERMINATE TEST
                                0B48  5030 10$:     $DS_ABORT
    00010020 9F    6C   FA  0B48                      CALLG   (AP), a#DS$ABORT
                                0B4F  5031                                            ; read continue
             54   FFF3CB00 8F   D0  0B4F  5032 20$:     MOVL    #DELAY_TIME3,R4         ; load receive packet delay time
             55   00000000'FF   9E  0B56  5033          MOVAB   aA_BUFFER_BEGIN,R5      ; load buffer address to store data
                  57   55   01   C1  0B5D  5034          ADDL3   #1,R5,R7                ; load last expected address of data
                  00002083'EF   16  0B61  5035          JSB     RECEIVE_TU58            ; go get data from TU58
```

```
                5A   00000023'EF   9E   0B67  5036          MOVAB   B_CONTINUE,R10                  ; load address of expected data
                5B   00000000'FF   9E   0B6E  5037          MOVAB   aA_BUFFER_BEGIN,R11             ; load address of actual data
                        57   55    D1   0B75  5038          CMPL    R5,R7                           ; check for correct number of bytes
                             2A    13   0B78  5039          BEQL    60$                             ; br = correct number of bytes
                                         0B7A  5040 25$:     $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                                         0B7A  5041                          P1=#T_REC_CONT
                     00001D47'8F    DD   0B7A                              PUSHL   #T_REC_CONT
                     00001EB4'EF    DF   0B80                              PUSHAL  REC_ERR
                     0000190D'EF    DF   0B86                              PUSHAL  T_WR_REC_ERR
                                00  DD   0B8C                              PUSHL   #0
                                02  DD   0B8E                              PUSHL   #$ER
                                         0B90          ;;; TEST 10, SUBTEST 6, ERROR 2
           000100D0 9F          05  FB   0B90                              CALLS   #$$M, a#DS$ERRHARD
                                         0B97  5042          $DS_BNCOMPLETE  30$
                           03 50  E9   0B97                              BLBC    R0, 30$
                                         0B9A  5043          $DS_ABORT       TEST
                                50  D4   0B9A                              CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                                04  0B9C                                  RET                             ; TERMINATE TEST
                                         0B9D  5044
                                         0B9D  5045 30$:     $DS_ABORT
           00010020 9F          6C  FA   0B9D                              CALLG   (AP), a#DS$ABORT
                                         0BA4  5046                                                      ; check continue
                        5C      01  D0   0BA4  5047 60$:     MOVL    #1,R12                          ; load number of bytes to check
                                         0BA7  5048          $DS_BREAK
           00010058 9F          6E  FA   0BA7                              CALLG   (SP), a#DS$BREAK
                0000213B'EF         16   0BAE  5049          JSB     CHECK_PACKET                    ; go check end packet
                                         0BB4  5050          $DS_BNCOMPLETE  80$                     ; br = no error
                           24 50  E9   0BB4                              BLBC    R0, 80$
                                         0BB7  5051          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_CONT
                     00001E4D'EF    DF   0BB7                              PUSHAL  DATA_ERR_CONT
                     0000190D'EF    DF   0BBD                              PUSHAL  T_WR_REC_ERR
                                00  DD   0BC3                              PUSHL   #0
                                03  DD   0BC5                              PUSHL   #$ER
                                         0BC7          ;;; TEST 10, SUBTEST 6, ERROR 3
           000100D0 9F          04  FB   0BC7                              CALLS   #$$M, a#DS$ERRHARD
                                         0BCE  5052          $DS_BNCOMPLETE  70$
                           03 50  E9   0BCE                              BLBC    R0, 70$
                                         0BD1  5053          $DS_ABORT       TEST
                                50  D4   0BD1                              CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                                04  0BD3                                  RET                             ; TERMINATE TEST
                                         0BD4  5054 70$:     $DS_ABORT
           00010020 9F          6C  FA   0BD4                              CALLG   (AP), a#DS$ABORT
                                         0BDB  5055                                                      ; send data packet
           54   FFFB6C20 8F     D0   0BDB  5056 80$:     MOVL    #DELAY_TIME1,R4                 ; load send packet delay time
           55   0000070A'EF     9E   0BE2  5057          MOVAB   B_DATA_PKT_2,R5                 ; point to data packet
           57   00000084 8F     D0   0BE9  5058          MOVL    #132,R7                         ; load transfer byte count
                0000203D'EF     16   0BF0  5059          JSB     SEND_TU58                       ; send data packet
      24 00000000'EF            00   E1   0BF6  5060          BBC     #V_CLOCK_FLAG,B_FLAGS,100$ ; br = no timeout error
                                         0BFE  5061          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
                     00001BEB'EF    DF   0BFE                              PUSHAL  NO_READY
                     0000190D'EF    DF   0C04                              PUSHAL  T_WR_REC_ERR
                                00  DD   0C0A                              PUSHL   #0
                                04  DD   0C0C                              PUSHL   #$ER
                                         0C0E          ;;; TEST 10, SUBTEST 6, ERROR 4
           000100D0 9F          04  FB   0C0E                              CALLS   #$$M, a#DS$ERRHARD
```

```
                                0C15  5062          $DS_BNCOMPLETE  90$
                  03 50    E9   0C15                        BLBC    R0, 90$
                                0C18  5063          $DS_ABORT       TEST
                     50    D4   0C18                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                           04   0C1A                        RET                         ; TERMINATE TEST
                                0C1B  5064 90$:     $DS_ABORT
      00010020 9F    6C    FA   0C1B                        CALLG   (AP), a#DS$ABORT
                                0C22  5065                                              ; read end packet
           00000002'EF     96   0C22  5066 100$:    INCB    B_FLAGS3                    ; set data done flag
      54   FFC2F700 8F     D0   0C28  5067          MOVL    #DELAY_TIME6,R4             ; load receive packet delay time
      55   00000000'FF     9E   0C2F  5068          MOVAB   @A_BUFFER_BEGIN,R5          ; load address to store actual data
         57    55    0E    C1   0C36  5069          ADDL3   #14,R5,R7                   ; load last expected address of data
           00002083'EF     16   0C3A  5070          JSB     RECEIVE_TU58                ; go get data from TU58
      5A   0000060C'EF     9E   0C40  5071          MOVAB   B_END_PACKET_5,R10          ; load address of expected end packet
      5B   00000000'FF     9E   0C47  5072          MOVAB   @A_BUFFER_BEGIN,R11         ; load address of actual end packet
                57    55    D1   0C4E  5073          CMPL    R5,R7                       ; check for correct number of bytes
                     31    13   0C51  5074          BEQL    140$                        ; br = correct number of bytes
      00000000'EF    08    88   0C53  5075          BISB2   #M_END_FLAG,B_FLAGS         ; set end error flag
                                0C5A  5076 105$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                                0C5A  5077                          P1=#T_REC_END
           00001D2E'8F     DD   0C5A                        PUSHL   #T_REC_END
           00001EB4'EF     DF   0C60                        PUSHAL  REC_ERR
           0000190D'EF     DF   0C66                        PUSHAL  T_WR_REC_ERR
                     00    DD   0C6C                        PUSHL   #0
                     05    DD   0C6E                        PUSHL   #$ER
                                0C70        ;;; TEST 10, SUBTEST 6, ERROR 5
      000100D0 9F    05    FB   0C70                        CALLS   #$$M, a#DS$ERRHARD
                                0C77  5078          $DS_BNCOMPLETE  110$
                  03 50    E9   0C77                        BLBC    R0, 110$
                                0C7A  5079          $DS_ABORT       TEST
                     50    D4   0C7A                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                           04   0C7C                        RET                         ; TERMINATE TEST
                                0C7D  5080
                                0C7D  5081 110$:    $DS_ABORT
      00010020 9F    6C    FA   0C7D                        CALLG   (AP), a#DS$ABORT
                                0C84  5082                                              ; check end packet
                5C    0E    D0   0C84  5083 140$:    MOVL    #14,R12                     ; load number of bytes to check
                                0C87  5084          $DS_BREAK
      00010058 9F    6E    FA   0C87                        CALLG   (SP), a#DS$BREAK
           0000213B'EF     16   0C8E  5085          JSB     CHECK_PACKET                ; go check end packet
                                0C94  5086          $DS_BNCOMPLETE  160$                ; br = no error
                  24 50    E9   0C94                        BLBC    R0, 160$
                                0C97  5087          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_END
           00001E9D'EF     DF   0C97                        PUSHAL  DATA_ERR_END
           0000190D'EF     DF   0C9D                        PUSHAL  T_WR_REC_ERR
                     00    DD   0CA3                        PUSHL   #0
                     06    DD   0CA5                        PUSHL   #$ER
                                0CA7        ;;; TEST 10, SUBTEST 6, ERROR 6
      000100D0 9F    04    FB   0CA7                        CALLS   #$$M, a#DS$ERRHARD
                                0CAE  5088          $DS_BNCOMPLETE  150$
                  03 50    E9   0CAE                        BLBC    R0, 150$
                                0CB1  5089          $DS_ABORT       TEST
                     50    D4   0CB1                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                           04   0CB3                        RET                         ; TERMINATE TEST
                                0CB4  5090 150$:    $DS_ABORT
```

```
                00010020 9F   6C   FA  0CB4                          CALLG   (AP), a#DS$ABORT
                                   0CBB  5091 160$:
                                   0CBB  5092          $DS_ENDSUB
                                   0CBB        T10_S6_X:
        00010038 9F   00000060'EF  FA  0CBB                          CALLG   $S$, a#DS$ENDSUB
                                   0CC6  5093
                                   0CC6  5094          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 10.7:   READ RECORD
0CC6  5097 ;*
0CC6  5098 ; SUBTEST DESCRIPTION:
0CC6  5099 ;
0CC6  5100 ;       This subtest sends the TU58 a command packet to read the 128
0CC6  5101 ;       bytes of data that were written in the previous subtest. A
0CC6  5102 ;       timer is set and times out if there is no response between all
0CC6  5103 ;       byte transactions. The end packet and data packet are checked for
0CC6  5104 ;       errors. If any errors are encountered they are reported.
0CC6  5105 ;
0CC6  5106 ;
0CC6  5107 ; SUBTEST STEPS:
0CC6  5108 ;
0CC6  5109 ;       SUBTEST READ RECORD
0CC6  5110 ;       : Clear buffer
0CC6  5111 ;       : Point to read command packet
0CC6  5112 ;       : REPEAT
0CC6  5113 ;       : : Send command packet byte at a time
0CC6  5114 ;       : : Set timer
0CC6  5115 ;       : : IF timer expired and no response
0CC6  5116 ;       : : : THEN
0CC6  5117 ;       : : : Report no response error
0CC6  5118 ;       : : : Exit test
0CC6  5119 ;       : : ENDIF
0CC6  5120 ;       : : UNTIL all bytes sent
0CC6  5121 ;       : ENDREPEAT
0CC6  5122 ;       : REPEAT
0CC6  5123 ;       : : Set timer
0CC6  5124 ;       : : IF timer expired AND done set
0CC6  5125 ;       : : : THEN
0CC6  5126 ;       : : : : Read byte
0CC6  5127 ;       : : ENDIF
0CC6  5128 ;       : : UNTIL timer expired AND done clear
0CC6  5129 ;       : ENDREPEAT
0CC6  5130 ;       : IF expected byte count NEQ actual byte count
0CC6  5131 ;       : : THEN
0CC6  5132 ;       : : : Report error
0CC6  5133 ;       : : : Exit test
0CC6  5134 ;       : ENDIF
0CC6  5135 ;       : Point to expected data packet
0CC6  5136 ;       : REPEAT
0CC6  5137 ;       : : IF data expected NEQ data received
0CC6  5138 ;       : : : THEN
0CC6  5139 ;       : : : Report data error
0CC6  5140 ;       : : : Exit subtest
0CC6  5141 ;       : : ENDIF
0CC6  5142 ;       : : Point to next byte of data
0CC6  5143 ;       : : UNTIL all data in packet checked
0CC6  5144 ;       : ENDREPEAT
0CC6  5145 ;       : Point to expected end packet
0CC6  5146 ;       : REPEAT
0CC6  5147 ;       : : IF expected end packet data NEQ received end packet data
0CC6  5148 ;       : : : THEN
0CC6  5149 ;       : : : Report end packet data error
0CC6  5150 ;       : : : Exit subtest
```

```
                        0CC6  5151 ;       :  : ENDIF
                        0CC6  5152 ;       :  : UNTIL all end packet bytes checked
                        0CC6  5153 ;       :  ENDREPEAT
                        0CC6  5154 ;       ENDSUBTEST READ RECORD
                        0CC6  5155 ;
                        0CC6  5156 ;
                        0CC6  5157 ;
                        0CC6  5158 :.page
                        0CC6  5159 :-
                        0CC6  5160         $DS_BGNSUB
                        0CC6       T10_S7::
00010030 9F   0000006C'EF   FA  0CC6                   CALLG   $S$, a#DS$BGNSUB
                        0CD1  5161                                      ; clear buffers
         00000000'EF    94  0CD1  5162         CLRB    B_FLAGS          ; initialize flags
      58 00000000'FF    9E  0CD7  5163         MOVAB   @A_BUFFER_BEGIN,R8 ; load buffer starting address
      59 00000400 8F    D0  0CDE  5164         MOVL    #1024,R9         ; do two pages
         00002134'EF    16  0CE5  5165         JSB     CLEAR_BUFFER     ; go clear buffers
                        0CEB  5166                                      ; send read command
      54 FFF3CB00 8F    D0  0CEB  5167         MOVL    #DELAY_TIME3,R4  ; load send packet delay time
      55 00000094'EF    9E  0CF2  5168         MOVAB   B_READ_3_CMD,R5  ; point to read command packet
            57    0E    D0  0CF9  5169         MOVL    #14,R7           ; load transfer byte count
         0000203D'EF    16  0CFC  5170         JSB     SEND_TU58        ; send command packet
   24 00000000'EF    00  E1  0D02  5171         BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                        0D0A  5172         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=NO_READY
         00001BEB'EF    DF  0D0A                   PUSHAL  NO_READY
         00001931'EF    DF  0D10                   PUSHAL  T_RD_REC_ERR
                    00  DD  0D16                   PUSHL   #0
                    01  DD  0D18                   PUSHL   #$ER
                        0D1A       ;;; TEST 10, SUBTEST 7, ERROR 1
00010DD0 9F     04  FB  0D1A                   CALLS   #$$M, a#DS$ERRHARD
                        0D21  5173         $DS_BNCOMPLETE  1$
            03 50   E9  0D21                   BLBC    R0, 1$
                        0D24  5174         $DS_ABORT       TEST
                    50  D4  0D24                   CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                        0D26                       RET                      ; TERMINATE TEST
                        0D27  5175 1$:     $DS_ABORT
00010020 9F     6C  FA  0D27                   CALLG   (AP), a#DS$ABORT
                        0D2E  5176                                      ; read data and end packet
   54 FFF3CB00 8F    D0  0D2E  5177 2$:     MOVL    #DELAY_TIME3,R4  ; load receive packet delay time
   55 00000000'FF    9E  0D35  5178         MOVAB   @A_BUFFER_BEGIN,R5 ; load buffer address to store data
57 55 00000092 8F    C1  0D3C  5179         ADDL3   #146,R5,R7       ; load last expected address of data
      00002083'EF    16  0D44  5180         JSB     RECEIVE_TU58     ; go get data from TU58
   5B 00000000'FF    9E  0D4A  5181         MOVAB   @A_BUFFER_BEGIN,R11 ; load address of actual data
   5A 0000070A'EF    9E  0D51  5182         MOVAB   B_DATA_PKT_2,R10 ; load address of expected data
         57    55   D1  0D58  5183         CMPL    R5,R7            ; check for correct number of bytes
               31   13  0D5B  5184         BEQL    6$               ; br = correct number of bytes
00000000'EF     04  88  0D5D  5185         BISB2   #M_DATA_FLAG,B_FLAGS ; set data error flag
                        0D64  5186 3$:     $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=REC_ERR,-
                        0D64  5187                         P1=#T_REC_DATA
      00001D68'8F   DD  0D64                   PUSHL   #T_REC_DATA
      00001EB4'EF   DF  0D6A                   PUSHAL  REC_ERR
      00001931'EF   DF  0D70                   PUSHAL  T_RD_REC_ERR
                00  DD  0D76                   PUSHL   #0
                02  DD  0D78                   PUSHL   #$ER
                        0D7A       ;;; TEST 10, SUBTEST 7, ERROR 2
```

```
000100D0 9F   05   FB  0D7A                        CALLS   #$$M, a#DS$ERRHARD
                  0D81  5188          $DS_BNCOMPLETE  4$
            03 50 E9  0D81                        BLBC    R0, 4$
                  0D84  5189          $DS_ABORT       TEST
               50 D4  0D84                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                  04  0D86                        RET                         ; TERMINATE TEST
                  0D87  5190
                  0D87  5191 4$:      $DS_ABORT
00010020 9F   6C   FA  0D87                        CALLG   (AP), a#DS$ABORT
                  0D8E  5192                                                  ; check data packet
5C 00000084 8F   D0  0D8E  5193 6$:   MOVL    #132,R12                      ; load number of bytes to check
                  0D95  5194          $DS_BREAK
00010058 9F   6E   FA  0D95                        CALLG   (SP), a#DS$BREAK
     0000213B'EF  16  0D9C  5195          JSB     CHECK_PACKET                ; go check data packet
                  0DA2  5196          $DS_BNCOMPLETE  8$                      ; br = no error
            24 50 E9  0DA2                        BLBC    R0, 8$
                  0DA5  5197          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=DATA_ERR_DATA
     00001E75'EF  DF  0DA5                        PUSHAL  DATA_ERR_DATA
     00001931'EF  DF  0DAB                        PUSHAL  T_RD_REC_ERR
               00 DD  0DB1                        PUSHL   #0
               03 DD  0DB3                        PUSHL   #$ER
                  0DB5       ;;; TEST 10, SUBTEST 7, ERROR 3
000100D0 9F   04   FB  0DB5                        CALLS   #$$M, a#DS$ERRHARD
                  0DBC  5198          $DS_BNCOMPLETE  7$
            03 50 E9  0DBC                        BLBC    R0, 7$
                  0DBF  5199          $DS_ABORT       TEST
               50 D4  0DBF                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                  04  0DC1                        RET                         ; TERMINATE TEST
                  0DC2  5200 7$:      $DS_ABORT
00010020 9F   6C   FA  0DC2                        CALLG   (AP), a#DS$ABORT
                  0DC9  5201                                                  ; check end packet
5B 00000084 8F   C0  0DC9  5202 8$:   ADDL2   #132,R11                      ; adjust pointer to next packet
5A 0000060C'EF   9E  0DD0  5203       MOVAB   B_END_PACKET_5,R10            ; load address of expected end packet
         5C   0E  D0  0DD7  5204       MOVL    #14,R12                       ; load number of bytes to check
                  0DDA  5205          $DS_BREAK
00010058 9F   6E   FA  0DDA                        CALLG   (SP), a#DS$BREAK
     0000213B'EF  16  0DE1  5206          JSB     CHECK_PACKET                ; go check end packet
                  0DE7  5207          $DS_BNCOMPLETE  10$                     ; br = no error
            24 50 E9  0DE7                        BLBC    R0, 10$
                  0DEA  5208          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=DATA_ERR_END
     00001E9D'EF  DF  0DEA                        PUSHAL  DATA_ERR_END
     00001931'EF  DF  0DF0                        PUSHAL  T_RD_REC_ERR
               00 DD  0DF6                        PUSHL   #0
               04 DD  0DF8                        PUSHL   #$ER
                  0DFA       ;;; TEST 10, SUBTEST 7, ERROR 4
000100D0 9F   04   FB  0DFA                        CALLS   #$$M, a#DS$ERRHARD
                  0E01  5209          $DS_BNCOMPLETE  9$                      ; br = error, but continue
            03 50 E9  0E01                        BLBC    R0, 9$
                  0E04  5210          $DS_ABORT       TEST
               50 D4  0E04                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                  04  0E06                        RET                         ; TERMINATE TEST
                  0E07  5211 9$:      $DS_ABORT
00010020 9F   6C   FA  0E07                        CALLG   (AP), a#DS$ABORT
                  0E0E  5212 10$:
                  0E0E  5213          $DS_ENDSUB
```

```
                        0E0E        T10_S7_X:
00010038 9F   0000006C'EF   FA  0E0E                    CALLG   $S$, a#DS$ENDSUB
                            0E19  5214
                            0E19  5215          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 10.8:   WRITE BLOCK - PADDED ZEROS
                ;*
                ; SUBTEST DESCRIPTION:
                ;
                ;       This subtest sends the TU58 a series of command packets to check
                ;       that a block written with less than 512 bytes of data, will
                ;       pad the remainder of the block with data bytes of zeros. This
                ;       is accomplished by writing two consecutive blocks each with
                ;       512 bytes of all ones. Then a command packet is sent to
                ;       write the first block with one byte of alternating ones and
                ;       zeroes. This command should write the first byte with
                ;       10101010 and the remaining 511 bytes with 00000000. The second
                ;       block should still contain 512 bytes of all one's data. This data
                ;       is read and checked. All end packets and data packets are checked as
                ;       the subtest progresses. All byte transactions between host and TU58 are
                ;       timed. If any errors are encountered, they are reported.
                ;
                ;
                ; SUBTEST STEPS:
                ;
                ;
                ;       SUBTEST WRITE BLOCK PADDED ZEROS
                ;       :  Clear buffer
                ;       :  Point to first write command packet
                ;       :  DO for count = 1 to 3
                ;       :  :  REPEAT
                ;       :  :  :  Send command packet byte at a time
                ;       :  :  :  Set timer
                ;       :  :  :  IF timer expired AND no response
                ;       :  :  :  :  THEN
                ;       :  :  :  :  Report no response error
                ;       :  :  :  :  Exit test
                ;       :  :  :  ENDIF
                ;       :  :  : UNTIL all bytes sent
                ;       :  :  ENDREPEAT
                ;       :  :  DO for count = 1 to 4
                ;       :  :  :  Wait for continue
                ;       :  :  :  Set timer
                ;       :  :  :  IF timer expired AND no continue
                ;       :  :  :  :  THEN
                ;       :  :  :  :  Report no continue error
                ;       :  :  :  :  Exit test
                ;       :  :  :  ENDIF
                ;       :  :  :  Point to data packet
                ;       :  :  :  REPEAT
                ;       :  :  :  :  Send data packet byte at a time
                ;       :  :  :  :  Set timer
                ;       :  :  :  :  IF timer expired AND no response
                ;       :  :  :  :  :  THEN
                ;       :  :  :  :  :  Report no response error
                ;       :  :  :  :  :  Exit test
                ;       :  :  :  :  ENDIF
                ;       :  :  :  : UNTIL all bytes sent
                ;       :  :  :  ENDREPEAT
                ;       :  :  ENDDO
```

```
0E19  5272 ;        :  :  REPEAT
0E19  5273 ;        :  :  :  Set timer
0E19  5274 ;        :  :  :  IF timer expired AND done set
0E19  5275 ;        :  :  :  :  THEN
0E19  5276 ;        :  :  :  :  :  Read byte
0E19  5277 ;        :  :  :  ENDIF
0E19  5278 ;        :  :  : UNTIL timer expired AND done clear
0E19  5279 ;        :  :  ENDREPEAT
0E19  5280 ;        :  :  IF expected byte count NEQ actual byte count
0E19  5281 ;        :  :  :  THEN
0E19  5282 ;        :  :  :  :  Report error
0E19  5283 ;        :  :  :  :  Exit test
0E19  5284 ;        :  :  ENDIF
0E19  5285 ;        :  :  REPEAT
0E19  5286 ;        :  :  :  Point to expected end packet
0E19  5287 ;        :  :  :  IF expected end data NEQ received end data
0E19  5288 ;        :  :  :  :  THEN
0E19  5289 ;        :  :  :  :  Report end packet data error
0E19  5290 ;        :  :  :  ENDIF
0E19  5291 ;        :  :  : UNTIL all data checked
0E19  5292 ;        :  :  ENDREPEAT
0E19  5293 ;        :  :  Point to next write command
0E19  5294 ;        :  ENDDO
0E19  5295 ;        :  Clear buffer
0E19  5296 ;        :  Point to first read command packet
0E19  5297 ;        :  DO for count = 1 to 2
0E19  5298 ;        :  :  REPEAT
0E19  5299 ;        :  :  :  Send command packet byte at a time
0E19  5300 ;        :  :  :  Set timer
0E19  5301 ;        :  :  :  IF timer expired and no response
0E19  5302 ;        :  :  :  :  THEN
0E19  5303 ;        :  :  :  :  Report no response error
0E19  5304 ;        :  :  :  :  Exit test
0E19  5305 ;        :  :  :  ENDIF
0E19  5306 ;        :  :  : UNTIL all bytes sent
0E19  5307 ;        :  :  ENDREPEAT
0E19  5308 ;        :  :  :  REPEAT
0E19  5309 ;        :  :  :  Set timer
0E19  5310 ;        :  :  :  IF timer expired AND done set
0E19  5311 ;        :  :  :  :  THEN
0E19  5312 ;        :  :  :  :  :  Read byte
0E19  5313 ;        :  :  :  ENDIF
0E19  5314 ;        :  :  : UNTIL timer expired AND done clear
0E19  5315 ;        :  :  ENDREPEAT
0E19  5316 ;        :  :  IF expected byte count NEQ actual byte count
0E19  5317 ;        :  :  :  THEN
0E19  5318 ;        :  :  :  :  Report error
0E19  5319 ;        :  :  :  :  Exit test
0E19  5320 ;        :  :  ENDIF
0E19  5321 ;        :  :  REPEAT
0E19  5322 ;        :  :  :  Point to expected data packet
0E19  5323 ;        :  :  :  REPEAT
0E19  5324 ;        :  :  :  :  IF data expected NEQ data received
0E19  5325 ;        :  :  :  :  :  THEN
0E19  5326 ;        :  :  :  :  :  Report data error
```

```
                     0E19  5327 ;       : : : : : Exit subtest
                     0E19  5328 ;       : : : : ENDIF
                     0E19  5329 ;       : : : : Point to next byte of data
                     0E19  5330 ;       : : : : UNTIL all data in packet checked
                     0E19  5331 ;       : : : ENDREPEAT
                     0E19  5332 ;       : : : UNTIL 4 data packets checked
                     0E19  5333 ;       : : ENDREPEAT
                     0E19  5334 ;       : : Point to expected end packet
                     0E19  5335 ;       : : REPEAT
                     0E19  5336 ;       : : : IF end data expected NEQ end data received
                     0E19  5337 ;       : : : : THEN
                     0E19  5338 ;       : : : : Report end packet data error
                     0E19  5339 ;       : : : : Exit subtest
                     0E19  5340 ;       : : : ENDIF
                     0E19  5341 ;       : : : UNTIL all end packet bytes checked
                     0E19  5342 ;       : : ENDREPEAT
                     0E19  5343 ;       : ENDDO
                     0E19  5344 ;       ENDSUBTEST WRITE BLOCK PADDED ZEROS
                     0E19  5345 ;
                     0E19  5346 ;
                     0E19  5347 ;
                     0E19  5348 ;.page
                     0E19  5349 ;-
                     0E19  5350         $DS_BGNSUB
                     0E19       T10_S8::
00010030 9F 00000078'EF  FA  0E19                CALLG   $S$, a#DS$BGNSUB
           00000004'EF  94  0E24  5351       CLRB    B_COUNT1                ; initialize command counter
      00000005'EF   03  90  0E2A  5352       MOVB    #3,B_COUNT2             ; init data packet counter
0000000E'EF 00000084 8F  D0  0E31  5353       MOVL    #132,L_COUNT3           ; init data counter
      53  0000132B'EF  9E  0E3C  5354       MOVAB   COMMAND_TBL_1,R3        ; load pointer to command table
                     0E43  5355                                           ; clear buffers
           00000000'EF  94  0E43  5356 10$:  CLRB    B_FLAGS                 ; initialize flags
      58   00000000'FF  9E  0E49  5357       MOVAB   a#BUFFER_BEGIN,R8       ; load buffer starting address
      59   00000600 8F  D0  0E50  5358       MOVL    #BUFFER_SIZE,R9         ; do all pages
           00002134'EF  16  0E57  5359       JSB     CLEAR_BUFFER            ; go clear buffers
                     0E5D  5360                                           ; send write command
      54   FFF3CB00 8F  D0  0E5D  5361       MOVL    #DELAY_TIME3,R4         ; load send packet delay time
             55  93  DE  0E64  5362       MOVAL   a(R3)+,R5               ; point to write command packet
             57  0E  D0  0E67  5363       MOVL    #14,R7                  ; load transfer byte count
           0000203D'EF  16  0E6A  5364       JSB     SEND_TU58               ; send command packet
   24 00000000'EF  00  E1  0E70  5365       BBC     #V_CLOCK_FLAG,B_FLAGS,30$ ; br = no timeout error
                     0E78  5366       $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=NO_READY
           00001BEB'EF  DF  0E78                PUSHAL  NO_READY
           000018C8'EF  DF  0E7E                PUSHAL  T_WR_BLK_ERR
                  00  DD  0E84                PUSHL   #0
                  01  DD  0E86                PUSHL   #$ER
                     0E88       ;;; TEST 10, SUBTEST 8, ERROR 1
      000100D0 9F   04  FB  0E88                CALLS   #$$M, a#DS$ERRHARD
                     0E8F  5367       $DS_BNCOMPLETE  20$
               03 50  E9  0E8F                BLBC    R0, 20$
                     0E92  5368       $DS_ABORT       TEST
                  50  D4  0E92                CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                  04  0E94                RET                             ; TERMINATE TEST
                     0E95  5369 20$:   $DS_ABORT
      00010020 9F   6C  FA  0E95                CALLG   (AP), a#DS$ABORT
```

```
                                0E9C  5370                                                  ; read continue
        00000003'EF    94       0E9C  5371 30$:    CLRB    B_COUNT                          ; initialize data packet counter
   54   FFC2F700 8F    D0       0EA2  5372 35$:    MOVL    #DELAY_TIME6,R4                  ; load receive packet delay time
   55   00000000'FF    9E       0EA9  5373         MOVAB   @A_BUFFER_BEGIN,R5               ; load buffer address to store data
      57    55    01    C1       0EB0  5374         ADDL3   #1,R5,R7                         ; load last expected address of data
        00002083'EF    16       0EB4  5375         JSB     RECEIVE_TU58                     ; go get data from TU58
   5A   00000023'EF    9E       0EBA  5376         MOVAB   B_CONTINUE,R10                   ; load address of expected data
   5B   00000000'FF    9E       0EC1  5377         MOVAB   @A_BUFFER_BEGIN,R11              ; load address of actual data
            57    55    D1       0EC8  5378         CMPL    R5,R7                            ; check for correct number of bytes
                  2A    13       0ECB  5379         BEQL    70$                              ; br = correct number of bytes
                                0ECD  5380 37$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=REC_ERR,-
                                0ECD  5381                         P1=#T_REC_CONT
        00001D47'8F    DD       0ECD                         PUSHL   #T_REC_CONT
        00001EB4'EF    DF       0ED3                         PUSHAL  REC_ERR
        000018C8'EF    DF       0ED9                         PUSHAL  T_WR_BLK_ERR
                  00    DD       0EDF                         PUSHL   #0
                  02    DD       0EE1                         PUSHL   #$ER
                                0EE3          ;;; TEST 10, SUBTEST 8, ERROR 2
   000100D0 9F    05    FB       0EE3                         CALLS   #$$M, @#DS$ERRHARD
                                0EEA  5382         $DS_BNCOMPLETE  40$
              03 50    E9       0EEA                         BLBC    R0, 40$
                                0EED  5383         $DS_ABORT       TEST
                  50    D4       0EED                         CLRL    R0                       ; SEND A WARNING TO THE SUPERVISOR
                        04       0EEF                         RET                              ; TERMINATE TEST
                                0EF0  5384
                                0EF0  5385 40$:    $DS_ABORT
   00010020 9F    6C    FA       0EF0                         CALLG   (AP), @#DS$ABORT
                                0EF7  5386                                                  ; check continue
            5C    01    D0       0EF7  5387 70$:    MOVL    #1,R12                           ; load number of bytes to check
                                0EFA  5388         $DS_BREAK
   00010058 9F    6E    FA       0EFA                         CALLG   (SP), @#DS$BREAK
        0000213B'EF    16       0F01  5389         JSB     CHECK_PACKET                     ; go check continue
                                0F07  5390         $DS_BNCOMPLETE  90$                      ; br = no error
              24 50    E9       0F07                         BLBC    R0, 90$
                                0F0A  5391         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=DATA_ERR_CONT
        00001E4D'EF    DF       0F0A                         PUSHAL  DATA_ERR_CONT
        000018C8'EF    DF       0F10                         PUSHAL  T_WR_BLK_ERR
                  00    DD       0F16                         PUSHL   #0
                  03    DD       0F18                         PUSHL   #$ER
                                0F1A          ;;; TEST 10, SUBTEST 8, ERROR 3
   000100D0 9F    04    FB       0F1A                         CALLS   #$$M, @#DS$ERRHARD
                                0F21  5392         $DS_BNCOMPLETE  80$
              03 50    E9       0F21                         BLBC    R0, 80$
                                0F24  5393         $DS_ABORT       TEST
                  50    D4       0F24                         CLRL    R0                       ; SEND A WARNING TO THE SUPERVISOR
                        04       0F26                         RET                              ; TERMINATE TEST
                                0F27  5394 80$:    $DS_ABORT
   00010020 9F    6C    FA       0F27                         CALLG   (AP), @#DS$ABORT
                                0F2E  5395                                                  ; send data packet
   54   FFFB6C20 8F    D0       0F2E  5396 90$:    MOVL    #DELAY_TIME1,R4                  ; load send packet delay time
            55    93    DE       0F35  5397         MOVAL   @(R3)+,R5                        ; point to data packet
   57   0000000E'EF    D0       0F38  5398         MOVL    L_COUNT3,R7                      ; load transfer byte count
        0000203D'EF    16       0F3F  5399         JSB     SEND_TU58                        ; send data packet
24 00000000'EF    00    E1       0F45  5400         BBC     #V_CLOCK_FLAG,B_FLAGS,110$ ; br = no timeout error
                                0F4D  5401         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=NO_READY
```

```
                00001BEB'EF   DF   0F4D                          PUSHAL  NO_READY
                000018C8'EF   DF   0F53                          PUSHAL  T_WR_BLK_ERR
                        00    DD   0F59                          PUSHL   #0
                        04    DD   0F5B                          PUSHL   #$ER
                                   0F5D          ;;; TEST 10, SUBTEST 8, ERROR 4
             000100D0 9F      04   FB   0F5D                          CALLS   #$$M, a#DS$ERRHARD
                                   0F64  5402           $DS_BNCOMPLETE  100$
                           03 50   E9   0F64                          BLBC    R0, 100$
                                   0F67  5403           $DS_ABORT       TEST
                              50   D4   0F67                          CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                              04   0F69                          RET                         ; TERMINATE TEST
                                   0F6A  5404 100$:     $DS_ABORT
             00010020 9F      6C   FA   0F6A                          CALLG   (AP), a#DS$ABORT
                                   0F71  5405
                00000000'FF    94   0F71  5406 110$:     CLRB    aA_BUFFER_BEGIN             ; clear buffer location used for data
00000003'EF     01 00000005'EF    9D   0F77  5407          ACBB    B_COUNT2,#1,B_COUNT,35$     ; br = not finished sending data
                                FF1D   0F83
                                   0F85  5408                                               ; read end packet
                54 FFE17B80 8F    D0   0F85  5409 115$:     MOVL    #DELAY_TIME5,R4             ; load receive packet delay time
                55 00000000'FF    9E   0F8C  5410          MOVAB   aA_BUFFER_BEGIN,R5          ; load buffer address to store data
                57    55    0E    C1   0F93  5411          ADDL3   #14,R5,R7                   ; load last expected address of data
                 00002083'EF      16   0F97  5412          JSB     RECEIVE_TU58                ; go get data from TU58
                     5A   93      DE   0F9D  5413          MOVAL   a(R3)+,R10                  ; load address of expected end packet
                5B 00000000'FF    9E   0FA0  5414          MOVAB   aA_BUFFER_BEGIN,R11         ; load address of actual end packet
                     57    55     D1   0FA7  5415          CMPL    R5,R7                       ; check for correct number of bytes
                           31    13   0FAA  5416          BEQL    150$                        ; br = correct number of bytes
                00000000'EF      08   88   0FAC  5417          BISB2   #M_END_FLAG,B_FLAGS         ; set end error flag
                                   0FB3  5418 117$:     $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=REC_ERR,-
                                   0FB3  5419                           P1=#T_REC_END
                     00001D2E'8F   DD   0FB3                          PUSHL   #T_REC_END
                     00001EB4'EF   DF   0FB9                          PUSHAL  REC_ERR
                     000018C8'EF   DF   0FBF                          PUSHAL  T_WR_BLK_ERR
                             00    DD   0FC5                          PUSHL   #0
                             05    DD   0FC7                          PUSHL   #$ER
                                   0FC9          ;;; TEST 10, SUBTEST 8, ERROR 5
             000100D0 9F      05   FB   0FC9                          CALLS   #$$M, a#DS$ERRHARD
                                   0FD0  5420           $DS_BNCOMPLETE  120$
                        03 50      E9   0FD0                          BLBC    R0, 120$
                                   0FD3  5421           $DS_ABORT       TEST
                              50   D4   0FD3                          CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                              04   0FD5                          RET                         ; TERMINATE TEST
                                   0FD6  5422
                                   0FD6  5423 120$:     $DS_ABORT
             00010020 9F      6C   FA   0FD6                          CALLG   (AP), a#DS$ABORT
                                   0FDD  5424                                               ; check end packet
                     5C    0E     D0   0FDD  5425 150$:     MOVL    #14,R12                     ; load number of bytes to check
                                   0FE0  5426           $DS_BREAK
             00010058 9F      6E   FA   0FE0                          CALLG   (SP), a#DS$BREAK
                  0000213B'EF      16   0FE7  5427          JSB     CHECK_PACKET                ; go check end packet
                                   0FED  5428           $DS_BNCOMPLETE  160$                ; br = no error
                        24 50      E9   0FED                          BLBC    R0, 160$
                                   0FF0  5429           $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=DATA_ERR_END
                     00001E9D'EF   DF   0FF0                          PUSHAL  DATA_ERR_END
                     000018C8'EF   DF   0FF6                          PUSHAL  T_WR_BLK_ERR
                             00    DD   0FFC                          PUSHL   #0
```

```
                        06   DD  0FFE                          PUSHL   #$ER
                                 1000        ;;; TEST 10, SUBTEST 8, ERROR 6
          000100D0 9F   04   FB  1000                          CALLS   #$$M, @#DS$ERRHARD
                                 1007  5430          $DS_BNCOMPLETE  155$
                     03 50   E9  1007                          BLBC    R0, 155$
                                 100A  5431          $DS_ABORT       TEST
                        50   D4  100A                          CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                             04  100C                          RET                         ; TERMINATE TEST
                                 100D  5432 155$:    $DS_ABORT
          00010020 9F   6C   FA  100D                          CALLG   (AP), @#DS$ABORT
            1A 00000005'EF   E9  1014  5433 160$:    BLBC    B_COUNT2,165$               ; go do read commands if writes done
   FE1E 00000004'EF   01   01  9D  101B  5434          ACBB    #1,#1,B_COUNT1,10$          ; br = not finished
              00000005'EF   94  1025  5435          CLRB    B_COUNT2                    ; set data packet counter for 1 packet
          0000000E'EF   05   D0  102B  5436          MOVL    #5,L_COUNT3                 ; set data count to 5 bytes
                      FE0E   31  1032  5437          BRW     10$                         ; go do last write
              00000004'EF   94  1035  5438 165$:    CLRB    B_COUNT1                    ; initialize command counter
                                 103B  5439                                              ; clear buffers
              00000000'EF   94  103B  5440 170$:    CLRB    B_FLAGS                     ; initialize flags
          58  00000000'FF   9E  1041  5441          MOVAB   @A_BUFFER_BEGIN,R8          ; load buffer starting address
          59  00000600 8F   D0  1048  5442          MOVL    #BUFFER_SIZE,R9             ; do all pages
              00002134'EF   16  104F  5443          JSB     CLEAR_BUFFER                ; go clear buffers
                                 1055  5444                                              ; send read command
          54  FFFB6C20 8F   D0  1055  5445          MOVL    #DELAY_TIME1,R4             ; load send packet delay time
                   55   93   DE  105C  5446          MOVAL   @(R3)+,R5                   ; point to read command packet
                   57   0E   D0  105F  5447          MOVL    #14,R7                      ; load transfer byte count
              0000203D'EF   16  1062  5448          JSB     SEND_TU58                   ; send command packet
       24 00000000'EF   00   E1  1068  5449          BBC     #V_CLOCK_FLAG,B_FLAGS,190$ ; br = no timeout error
                                 1070  5450          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=NO_READY
              00001BEB'EF   DF  1070                          PUSHAL  NO_READY
              000018EB'EF   DF  1076                          PUSHAL  T_RD_BLK_ERR
                        00   DD  107C                          PUSHL   #0
                        07   DD  107E                          PUSHL   #$ER
                                 1080        ;;; TEST 10, SUBTEST 8, ERROR 7
          000100D0 9F   04   FB  1080                          CALLS   #$$M, @#DS$ERRHARD
                                 1087  5451          $DS_BNCOMPLETE  180$
                     03 50   E9  1087                          BLBC    R0, 180$
                                 108A  5452          $DS_ABORT       TEST
                        50   D4  108A                          CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                             04  108C                          RET                         ; TERMINATE TEST
                                 108D  5453 180$:    $DS_ABORT
          00010020 9F   6C   FA  108D                          CALLG   (AP), @#DS$ABORT
                                 1094  5454                                              ; read data and end packets
          54  FFE17B80 8F   D0  1094  5455 190$:    MOVL    #DELAY_TIME5,R4             ; load receive packet delay time
          55  00000000'FF   9E  109B  5456          MOVAB   @A_BUFFER_BEGIN,R5          ; load buffer address to store data
   57     55  0000021E 8F   C1  10A2  5457          ADDL3   #542,R5,R7                  ; load last expected address of data
              00002083'EF   16  10AA  5458          JSB     RECEIVE_TU58                ; go get data from TU58
          5B  00000000'FF   9E  10B0  5459          MOVAB   @A_BUFFER_BEGIN,R11         ; load address of actual data
                   5A   93   DE  10B7  5460          MOVAL   @(R3)+,R10                  ; load address of expected data
                   57   55   D1  10BA  5461          CMPL    R5,R7                       ; check for correct number of bytes
                        31   13  10BD  5462          BEQL    230$                        ; br = correct number of bytes
          00000000'EF   04   88  10BF  5463          BISB2   #M_DATA_FLAG,B_FLAGS        ; set data error flag
                                 10C6  5464 195$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=REC_ERR,-
                                 10C6  5465                          P1=#T_REC_DATA
              00001D68'8F   DD  10C6                          PUSHL   #T_REC_DATA
              00001EB4'EF   DF  10CC                          PUSHAL  REC_ERR
```

```
                000018EB'EF   DF  10D2                        PUSHAL  T_RD_BLK_ERR
                          00  DD  10D8                        PUSHL   #0
                          08  DD  10DA                        PUSHL   #$ER
                              10DC        ;;; TEST 10, SUBTEST 8, ERROR 8
            000100D0 9F   05  FB  10DC                        CALLS   #$$M, a#DS$ERRHARD
                              10E3  5466          $DS_BNCOMPLETE  200$
                       03 50  E9  10E3                        BLBC    R0, 200$
                              10E6  5467          $DS_ABORT       TEST
                          50  D4  10E6                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                          04  10E8                        RET                     ; TERMINATE TEST
                              10E9  5468
                              10E9  5469 200$:    $DS_ABORT
            00010020 9F   6C  FA  10E9                        CALLG   (AP), a#DS$ABORT
                              10F0  5470                                        ; check data packets
                00000003'EF   94  10F0  5471 230$:    CLRB    B_COUNT                 ; clear counter to check 4 packets
         5C   00000084 8F   D0  10F6  5472          MOVL    #132,R12                ; load number of bytes to check
                              10FD  5473 240$:    $DS_BREAK
            00010058 9F   6E  FA  10FD                        CALLG   (SP), a#DS$BREAK
                 0000213B'EF  16  1104  5474          JSB     CHECK_PACKET            ; go check data packet
                              110A  5475          $DS_BNCOMPLETE  260$            ; br = no error
                       24 50  E9  110A                        BLBC    R0, 260$
                              110D  5476          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=DATA_ERR_DATA
                00001E75'EF   DF  110D                        PUSHAL  DATA_ERR_DATA
                000018EB'EF   DF  1113                        PUSHAL  T_RD_BLK_ERR
                          00  DD  1119                        PUSHL   #0
                          09  DD  111B                        PUSHL   #$ER
                              111D        ;;; TEST 10, SUBTEST 8, ERROR 9
            000100D0 9F   04  FB  111D                        CALLS   #$$M, a#DS$ERRHARD
                              1124  5477          $DS_BNCOMPLETE  250$
                       03 50  E9  1124                        BLBC    R0, 250$
                              1127  5478          $DS_ABORT       TEST
                          50  D4  1127                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                          04  1129                        RET                     ; TERMINATE TEST
                              112A  5479 250$:    $DS_ABORT
            00010020 9F   6C  FA  112A                        CALLG   (AP), a#DS$ABORT
         5B   00000084 8F   C0  1131  5480 260$:    ADDL2   #132,R11                ; adjust pointer to next packet
                    5A    93  DE  1138  5481          MOVAL   a(R3)+,R10              ; load address of expected data
FFB8 00000003'EF   01   03  9D  113B  5482          ACBB    #3,#1,B_COUNT,240$      ; br = not finished checking data
                              1145  5483                                        ; check end packet
                    5C    0E  D0  1145  5484          MOVL    #14,R12                 ; load number of bytes to check
                              1148  5485          $DS_BREAK
            00010058 9F   6E  FA  1148                        CALLG   (SP), a#DS$BREAK
                 0000213B'EF  16  114F  5486          JSB     CHECK_PACKET            ; go check end packet
                              1155  5487          $DS_BNCOMPLETE  270$            ; br = no error
                       24 50  E9  1155                        BLBC    R0, 270$
                              1158  5488          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=DATA_ERR_END
                00001E9D'EF   DF  1158                        PUSHAL  DATA_ERR_END
                000018EB'EF   DF  115E                        PUSHAL  T_RD_BLK_ERR
                          00  DD  1164                        PUSHL   #0
                          0A  DD  1166                        PUSHL   #$ER
                              1168        ;;; TEST 10, SUBTEST 8, ERROR 10
            000100D0 9F   04  FB  1168                        CALLS   #$$M, a#DS$ERRHARD
                              116F  5489          $DS_BNCOMPLETE  265$
                       03 50  E9  116F                        BLBC    R0, 265$
                              1172  5490          $DS_ABORT       TEST
```

```
                         50   D4  1172                    CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                              04  1174                    RET                     ; TERMINATE TEST
                                  1175  5491 265$:   $DS_ABORT
          00010020 9F    6C   FA  1175                    CALLG   (AP), a#DS$ABORT
    FEB5 00000003'EF     01   01  9D  117C  5492 270$:   ACBB    #1,#1,B_COUNT,170$      ; br = not finished reading
                                  1186  5493
                                  1186  5494
                                  1186  5495
                                  1186  5496
                                  1186  5497         $DS_ENDSUB
                                  1186       T10_S8_X:
     00010038 9F    00000078'EF   FA  1186                    CALLG   $S$, a#DS$ENDSUB
                                  1191  5498
                                  1191  5499         $DS_PAGE
```

```
1191                    .SBTTL  SUBTEST 10.9:   WRITE RECORD - PADDED ZEROS
1191   5502 ;+
1191   5503 ; SUBTEST DESCRIPTION:
1191   5504 ;
1191   5505 ;       This subtest sends the TU58 a series of command packets to check
1191   5506 ;       that a record written with less than 128 bytes of data, will
1191   5507 ;       pad the remainder of the record with data bytes of zeroes. This
1191   5508 ;       is accomplished by writing two consecutive records each with
1191   5509 ;       128 bytes of all ones. Then a command packet is sent to
1191   5510 ;       write the first record with one byte of alternating ones and
1191   5511 ;       zeroes data. This command should write the first byte with
1191   5512 ;       10101010 and the remaining 127 bytes with 00000000. The second
1191   5513 ;       block should still contain 128 bytes of all ones data. This data
1191   5514 ;       is read and checked. All end packets and data packets are checked as
1191   5515 ;       the subtest progresses. All byte transactions between the host and TU58
1191   5516 ;       are timed. If any errors are encountered, they are reported.
1191   5517 ;
1191   5518 ;
1191   5519 ; SUBTEST STEPS:
1191   5520 ;
1191   5521 ;
1191   5522 ;       SUBTEST WRITE RECORD PADDED ZEROS
1191   5523 ;       : Clear buffer
1191   5524 ;       : Point to first write command packet
1191   5525 ;       : DO for count = 1 to 3
1191   5526 ;       : : REPEAT
1191   5527 ;       : : : Send command packet byte at a time
1191   5528 ;       : : : Set timer
1191   5529 ;       : : : IF timer expired AND no response
1191   5530 ;       : : : : THEN
1191   5531 ;       : : : : Report no response error
1191   5532 ;       : : : : Exit test
1191   5533 ;       : : : ENDIF
1191   5534 ;       : : : UNTIL all bytes sent
1191   5535 ;       : : ENDREPEAT
1191   5536 ;       : : Wait for continue
1191   5537 ;       : : Set timer
1191   5538 ;       : : IF timer expired AND no continue
1191   5539 ;       : : : THEN
1191   5540 ;       : : : Report no continue error
1191   5541 ;       : : : Exit test
1191   5542 ;       : : ENDIF
1191   5543 ;       : : Point to data packet
1191   5544 ;       : : REPEAT
1191   5545 ;       : : : Send data packet byte at a time
1191   5546 ;       : : : Set timer
1191   5547 ;       : : : IF timer expired AND no response
1191   5548 ;       : : : : THEN
1191   5549 ;       : : : : Report no response error
1191   5550 ;       : : : : Exit test
1191   5551 ;       : : : ENDIF
1191   5552 ;       : : : UNTIL all bytes sent
1191   5553 ;       : : ENDREPEAT
1191   5554 ;       : : REPEAT
1191   5555 ;       : : : Set timer
```

```
1191  5556 ;       :  :  :  IF timer expired AND done set
1191  5557 ;       :  :  :  :  THEN
1191  5558 ;       :  :  :  :  :  Read byte
1191  5559 ;       :  :  :  ENDIF
1191  5560 ;       :  :  : UNTIL timer expired AND done clear
1191  5561 ;       :  :  ENDREPEAT
1191  5562 ;       :  :  IF expected byte count NEQ actual byte count
1191  5563 ;       :  :  :  THEN
1191  5564 ;       :  :  :  :  Report error
1191  5565 ;       :  :  :  :  Exit test
1191  5566 ;       :  :  ENDIF
1191  5567 ;       :  :  REPEAT
1191  5568 ;       :  :  :  Point to expected end packet
1191  5569 ;       :  :  :  IF expected end data NEQ received end data
1191  5570 ;       :  :  :  :  THEN
1191  5571 ;       :  :  :  :  Report end packet data error
1191  5572 ;       :  :  :  ENDIF
1191  5573 ;       :  :  : UNTIL all data checked
1191  5574 ;       :  :  ENDREPEAT
1191  5575 ;       :  :  Point to next write command
1191  5576 ;       :  ENDDO
1191  5577 ;       :  Clear buffer
1191  5578 ;       :  Point to first read command packet
1191  5579 ;       :  DO for count = 1 to 2
1191  5580 ;       :  :  REPEAT
1191  5581 ;       :  :  :  Send command packet byte at a time
1191  5582 ;       :  :  :  Set timer
1191  5583 ;       :  :  :  IF timer expired and no response
1191  5584 ;       :  :  :  :  THEN
1191  5585 ;       :  :  :  :  Report no response error
1191  5586 ;       :  :  :  :  Exit test
1191  5587 ;       :  :  :  ENDIF
1191  5588 ;       :  :  : UNTIL all bytes sent
1191  5589 ;       :  :  ENDREPEAT
1191  5590 ;       :  :  REPEAT
1191  5591 ;       :  :  :  Set timer
1191  5592 ;       :  :  :  IF timer expired AND done set
1191  5593 ;       :  :  :  :  THEN
1191  5594 ;       :  :  :  :  :  Read byte
1191  5595 ;       :  :  :  ENDIF
1191  5596 ;       :  :  : UNTIL timer expired AND done clear
1191  5597 ;       :  :  ENDREPEAT
1191  5598 ;       :  :  IF expected byte count NEQ actual byte count
1191  5599 ;       :  :  :  THEN
1191  5600 ;       :  :  :  :  Report error
1191  5601 ;       :  :  :  :  Exit test
1191  5602 ;       :  :  ENDIF
1191  5603 ;       :  :  Point to expected data packet
1191  5604 ;       :  :  REPEAT
1191  5605 ;       :  :  :  IF data expected NEQ data received
1191  5606 ;       :  :  :  :  THEN
1191  5607 ;       :  :  :  :  Report data error
1191  5608 ;       :  :  :  :  Exit subtest
1191  5609 ;       :  :  :  ENDIF
1191  5610 ;       :  :  :  Point to next byte of data
```

```
                     1191  5611 ;       :  :  : UNTIL all data in packet checked
                     1191  5612 ;       :  :  ENDREPEAT
                     1191  5613 ;       :  :  Point to expected end packet
                     1191  5614 ;       :  :  REPEAT
                     1191  5615 ;       :  :  :  IF end data expected NEQ end data received
                     1191  5616 ;       :  :  :  :  THEN
                     1191  5617 ;       :  :  :  :  Report end packet data error
                     1191  5618 ;       :  :  :  :  Exit subtest
                     1191  5619 ;       :  :  :  ENDIF
                     1191  5620 ;       :  :  : UNTIL all end packet bytes checked
                     1191  5621 ;       :  :  ENDREPEAT
                     1191  5622 ;       :  ENDDO
                     1191  5623 ;       ENDSUBTEST WRITE RECORD PADDED ZEROS
                     1191  5624 ;
                     1191  5625 ;
                     1191  5626 ;
                     1191  5627 ;.page
                     1191  5628 ;-
                     1191  5629          $DS_BGNSUB
                     1191          T10_S9::
00010030 9F  00000084'EF  FA 1191                  CALLG   $S$, a#DS$BGNSUB
                     119C  5630
          00000004'EF  94 119C  5631          CLRB    B_COUNT1                ; initialize command counter
0000000E'EF  00000084 8F  D0 11A2  5632          MOVL    #132,L_COUNT3           ; init byte count
          53  00001397'EF  9E 11AD  5633          MOVAB   COMMAND_TBL_2,R3        ; load pointer to command table
                     11B4  5634                                                  ; clear buffers
          00000000'EF  94 11B4  5635 10$:     CLRB    B_FLAGS                 ; initialize flags
       58 00000000'FF  9E 11BA  5636          MOVAB   @A_BUFFER_BEGIN,R8      ; load buffer starting address
       59 00000600 8F  D0 11C1  5637          MOVL    #BUFFER_SIZE,R9         ; do all pages
          00002134'EF  16 11C8  5638          JSB     CLEAR_BUFFER            ; go clear buffers
                     11CE  5639                                                  ; send write command
       54 FFF3CB00 8F  D0 11CE  5640          MOVL    #DELAY_TIME3,R4         ; load send packet delay time
             55    93  DE 11D5  5641          MOVAL   @(R3)+,R5               ; point to write command packet
             57    0E  D0 11D8  5642          MOVL    #14,R7                  ; load transfer byte count
          0000203D'EF  16 11DB  5643          JSB     SEND_TU58               ; send command packet
24 00000000'EF  00  E1 11E1  5644          BBC     #V_CLOCK_FLAG,B_FLAGS,30$ ; br = no timeout error
                     11E9  5645          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
          00001BEB'EF  DF 11E9                  PUSHAL  NO_READY
          0000190D'EF  DF 11EF                  PUSHAL  T_WR_REC_ERR
                    00  DD 11F5                  PUSHL   #0
                    01  DD 11F7                  PUSHL   #$ER
                     11F9       ::: TEST 10, SUBTEST 9, ERROR 1
000100D0 9F  04  FB 11F9                  CALLS   #$$M, a#DS$ERRHARD
                     1200  5646          $DS_BNCOMPLETE  20$
             03 50  E9 1200                  BLBC    R0, 20$
                     1203  5647          $DS_ABORT       TEST
                    50  D4 1203                  CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                    04 1205                  RET                             ; TERMINATE TEST
                     1206  5648 20$:     $DS_ABORT
00010020 9F  6C  FA 1206                  CALLG   (AP), a#DS$ABORT
                     120D  5649                                                  ; read continue
       54 FFF3CB00 8F  D0 120D  5650 30$:     MOVL    #DELAY_TIME3,R4         ; load receive packet delay time
       55  00000000'FF  9E 1214  5651          MOVAB   @A_BUFFER_BEGIN,R5      ; load buffer address to store data
          57    55  01  C1 121B  5652          ADDL3   #1,R5,R7                ; load last expected address of data
          00002083'EF  16 121F  5653          JSB     RECEIVE_TU58            ; go get data from TU58
```

```
                5A   00000023'EF    9E  1225  5654          MOVAB   B_CONTINUE,R10           ; load address of expected data
                5B   00000000'FF    9E  122C  5655          MOVAB   a#_BUFFER_BEGIN,R11     ; load address of actual data
                     57    55       D1  1233  5656          CMPL    R5,R7                   ; check for correct number of bytes
                           2A       13  1236  5657          BEQL    70$                     ; br = correct number of bytes
                                        1238  5658 35$:      $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                                        1238  5659                          P1=#T_REC_CONT
                           00001D47'8F  DD  1238                          PUSHL   #T_REC_CONT
                           00001EB4'EF  DF  123E                          PUSHAL  REC_ERR
                           0000190D'EF  DF  1244                          PUSHAL  T_WR_REC_ERR
                                   00   DD  124A                          PUSHL   #0
                                   02   DD  124C                          PUSHL   #$ER
                                        124E          ;;; TEST 10, SUBTEST 9, ERROR 2
                000100D0 9F        05   FB  124E                          CALLS   #$$M, a#DS$ERRHARD
                                        1255  5660          $DS_BNCOMPLETE  40$
                         03 50         E9  1255                          BLBC    R0, 40$
                                        1258  5661          $DS_ABORT       TEST
                                   50   D4  1258                          CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                                   04   125A                              RET                     ; TERMINATE TEST
                                        125B  5662
                                        125B  5663 40$:      $DS_ABORT
                00010020 9F        6C   FA  125B                          CALLG   (AP), a#DS$ABORT
                                        1262  5664                                              ; check continue
                         5C        01   D0  1262  5665 70$:      MOVL    #1,R12                  ; load number of bytes to check
                                        1265  5666          $DS_BREAK
                00010058 9F        6E   FA  1265                          CALLG   (SP), a#DS$BREAK
                     0000213B'EF        16  126C  5667          JSB     CHECK_PACKET            ; go check continue
                                        1272  5668          $DS_BNCOMPLETE  90$              ; br = no error
                               24 50    E9  1272                          BLBC    R0, 90$
                                        1275  5669          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_CONT
                           00001E4D'EF  DF  1275                          PUSHAL  DATA_ERR_CONT
                           0000190D'EF  DF  127B                          PUSHAL  T_WR_REC_ERR
                                   00   DD  1281                          PUSHL   #0
                                   03   DD  1283                          PUSHL   #$ER
                                        1285          ;;; TEST 10, SUBTEST 9, ERROR 3
                000100D0 9F        04   FB  1285                          CALLS   #$$M, a#DS$ERRHARD
                                        128C  5670          $DS_BNCOMPLETE  80$
                         03 50         E9  128C                          BLBC    R0, 80$
                                        128F  5671          $DS_ABORT       TEST
                                   50   D4  128F                          CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                                   04   1291                              RET                     ; TERMINATE TEST
                                        1292  5672 80$:      $DS_ABORT
                00010020 9F        6C   FA  1292                          CALLG   (AP), a#DS$ABORT
                                        1299  5673                                              ; send data packet
                54   FFFB6C20 8F        D0  1299  5674 90$:      MOVL    #DELAY_TIME1,R4         ; load send packet delay time
                              55    93   DE  12A0  5675          MOVAL   a(R3)+,R5               ; point to data packet
                57   0000000E'EF        D0  12A3  5676          MOVL    L_COUNT3,R7             ; load transfer byte count
                     0000203D'EF        16  12AA  5677          JSB     SEND_TU58               ; send data packet
            24 00000000'EF          00   E1  12B0  5678          BBC     #V_CLOCK_FLAG,B_FLAGS,110$ ; br = no timeout error
                                        12B8  5679          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
                           00001BEB'EF  DF  12B8                          PUSHAL  NO_READY
                           0000190D'EF  DF  12BE                          PUSHAL  T_WR_REC_ERR
                                   00   DD  12C4                          PUSHL   #0
                                   04   DD  12C6                          PUSHL   #$ER
                                        12C8          ;;; TEST 10, SUBTEST 9, ERROR 4
                000100D0 9F        04   FB  12C8                          CALLS   #$$M, a#DS$ERRHARD
```

```
                                12CF  5680          $DS_BNCOMPLETE  100$
                  03 50    E9   12CF                      BLBC    R0, 100$
                                12D2  5681          $DS_ABORT       TEST
                     50    D4   12D2                      CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                           04   12D4                      RET                         ; TERMINATE TEST
                                12D5  5682 100$:    $DS_ABORT
      00010020 9F    6C    FA   12D5                      CALLG   (AP), @#DS$ABORT
                                12DC  5683
           00000000'FF     94   12DC  5684 110$:    CLRB    @A_BUFFER_BEGIN             ; clear buffer used to store continue
                                12E2  5685                                              ; read end packet
      54   FFC2F700 8F     D0   12E2  5686          MOVL    #DELAY_TIME6,R4             ; load receive packet delay time
      55   00000000'FF     9E   12E9  5687          MOVAB   @A_BUFFER_BEGIN,R5          ; load buffer address to store data
          57    55    0E    C1   12F0  5688          ADDL3   #14,R5,R7                   ; load last expected address of data
           00002083'EF     16   12F4  5689          JSB     RECEIVE_TU58                ; go get data from TU58
                 5A    93    DE   12FA  5690          MOVAL   @(R3)+,R10                  ; load address of expected end packet
      5B   00000000'FF     9E   12FD  5691          MOVAB   @A_BUFFER_BEGIN,R11         ; load address of actual end packet
                 57    55    D1   1304  5692          CMPL    R5,R7                       ; check for correct number of bytes
                       31    13   1307  5693          BEQL    150$                        ; br = correct number of bytes
      00000000'EF    08    88   1309  5694          BISB2   #M_END_FLAG,B_FLAGS         ; set end error flag
                                1310  5695 115$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                                1310  5696                          P1=#T_REC_END
           00001D2E'8F     DD   1310                      PUSHL   #T_REC_END
           00001EB4'EF     DF   1316                      PUSHAL  REC_ERR
           0000190D'EF     DF   131C                      PUSHAL  T_WR_REC_ERR
                       00    DD   1322                      PUSHL   #0
                       05    DD   1324                      PUSHL   #$ER
                                1326          ;;; TEST 10, SUBTEST 9, ERROR 5
      000100D0 9F    05    FB   1326                      CALLS   #$$M, @#DS$ERRHARD
                                132D  5697          $DS_BNCOMPLETE  120$
                  03 50    E9   132D                      BLBC    R0, 120$
                                1330  5698          $DS_ABORT       TEST
                     50    D4   1330                      CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                           04   1332                      RET                         ; TERMINATE TEST
                                1333  5699
                                1333  5700 120$:    $DS_ABORT
      00010020 9F    6C    FA   1333                      CALLG   (AP), @#DS$ABORT
                                133A  5701                                              ; check end packet
                 5C    0E    D0   133A  5702 150$:    MOVL    #14,R12                     ; load number of bytes to check
                                133D  5703          $DS_BREAK
      00010058 9F    6E    FA   133D                      CALLG   (SP), @#DS$BREAK
           0000213B'EF     16   1344  5704          JSB     CHECK_PACKET                ; go check end packet
                                134A  5705          $DS_BNCOMPLETE  160$                ; br = no error
                  24 50    E9   134A                      BLBC    R0, 160$
                                134D  5706          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_END
           00001E9D'EF     DF   134D                      PUSHAL  DATA_ERR_END
           0000190D'EF     DF   1353                      PUSHAL  T_WR_REC_ERR
                       00    DD   1359                      PUSHL   #0
                       06    DD   135B                      PUSHL   #$ER
                                135D          ;;; TEST 10, SUBTEST 9, ERROR 6
      000100D0 9F    04    FB   135D                      CALLS   #$$M, @#DS$ERRHARD
                                1364  5707          $DS_BNCOMPLETE  155$
                  03 50    E9   1364                      BLBC    R0, 155$
                                1367  5708          $DS_ABORT       TEST
                     50    D4   1367                      CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                           04   1369                      RET                         ; TERMINATE TEST
```

```
                          136A  5709 155$:   $DS_ABORT
                                             CALLG   (AP), a#DS$ABORT
          00010020 9F   6C  FA  136A
            14 0000000E'EF  E8  1371  5710 160$:   BLBS    L_COUNT3,165$           ; go do reads if writes done
FE32 00000004'EF   01   01  9D  1378  5711         ACBB    #1,#1,B_COUNT1,10$      ; br = not finished
          0000000E'EF   05  D0  1382  5712         MOVL    #5,L_COUNT3             ; load byte count for last write
                     FE28  31  1389  5713         BRW     10$                     ; go do last write
               00000004'EF  94  138C  5714 165$:   CLRB    B_COUNT1                ; initialize command counter
                          1392  5715                                             ; clear buffers
               00000000'EF  94  1392  5716 170$:   CLRB    B_FLAGS                 ; initialize flags
          58   00000000'FF  9E  1398  5717         MOVAB   aA_BUFFER_BEGIN,R8      ; load buffer starting address
          59   00000600 8F  D0  139F  5718         MOVL    #BUFFER_SIZE,R9         ; do all pages
               00002134'EF  16  13A6  5719         JSB     CLEAR_BUFFER            ; go clear buffers
                          13AC  5720                                             ; send read command
          54   FFFB6C20 8F  D0  13AC  5721         MOVL    #DELAY_TIME1,R4         ; load send packet delay time
                    55   93  DE  13B3  5722         MOVAL   a(R3)+,R5               ; point to read command packet
                    57   0E  D0  13B6  5723         MOVL    #14,R7                  ; load transfer byte count
               0000203D'EF  16  13B9  5724         JSB     SEND_TU58               ; send command packet
        24 00000000'EF   00  E1  13BF  5725         BBC     #V_CLOCK_FLAG,B_FLAGS,190$ ; br = no timeout error
                          13C7  5726         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=NO_READY
               00001BEB'EF  DF  13C7                 PUSHAL  NO_READY
               00001931'EF  DF  13CD                 PUSHAL  T_RD_REC_ERR
                         00  DD  13D3                 PUSHL   #0
                         07  DD  13D5                 PUSHL   #$ER
                          13D7       ;;; TEST 10, SUBTEST 9, ERROR 7
          000100D0 9F   04  FB  13D7                 CALLS   #$$M, a#DS$ERRHARD
                          13DE  5727         $DS_BNCOMPLETE  180$
                    03 50  E9  13DE                 BLBC    R0, 180$
                          13E1  5728         $DS_ABORT       TEST
                         50  D4  13E1                 CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                         04  13E3                 RET                             ; TERMINATE TEST
                          13E4  5729 180$:   $DS_ABORT
          00010020 9F   6C  FA  13E4                 CALLG   (AP), a#DS$ABORT
                          13EB  5730                                             ; read data and end packets
          54   FFF3CB00 8F  D0  13EB  5731 190$:   MOVL    #DELAY_TIME3,R4         ; load receive packet delay time
          55   00000000'FF  9E  13F2  5732         MOVAB   aA_BUFFER_BEGIN,R5      ; load buffer address to store data
57        55   00000092 8F  C1  13F9  5733         ADDL3   #146,R5,R7              ; load last expected address of data
               00002083'EF  16  1401  5734         JSB     RECEIVE_TU58            ; go get data from TU58
          5B   00000000'FF  9E  1407  5735         MOVAB   aA_BUFFER_BEGIN,R11     ; load address of actual data
                    5A   93  DE  140E  5736         MOVAL   a(R3)+,R10              ; load address of expected data
                    57   55  D1  1411  5737         CMPL    R5,R7                   ; check for correct number of bytes
                         31  13  1414  5738         BEQL    230$                    ; br = correct number of bytes
          00000000'EF   04  88  1416  5739         BISB2   #M_DATA_FLAG,B_FLAGS    ; set data error flag
                          141D  5740 195$:   $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=REC_ERR,-
                          141D  5741                         P1=#T_REC_DATA
               00001D68'8F  DD  141D                 PUSHL   #T_REC_DATA
               00001EB4'EF  DF  1423                 PUSHAL  REC_ERR
               00001931'EF  DF  1429                 PUSHAL  T_RD_REC_ERR
                         00  DD  142F                 PUSHL   #0
                         08  DD  1431                 PUSHL   #$ER
                          1433       ;;; TEST 10, SUBTEST 9, ERROR 8
          000100D0 9F   05  FB  1433                 CALLS   #$$M, a#DS$ERRHARD
                          143A  5742         $DS_BNCOMPLETE  200$
                    03 50  E9  143A                 BLBC    R0, 200$
                          143D  5743         $DS_ABORT       TEST
                         50  D4  143D                 CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
```

```
                          04  143F                        RET                     ; TERMINATE TEST
                              1440  5744
                              1440  5745 200$:   $DS_ABORT
      00010020 9F    6C   FA  1440                        CALLG   (AP), a#DS$ABORT
                              1447  5746                                          ; check data packet
      5C   00000084 8F    D0  1447  5747 230$:   MOVL    #132,R12                ; load number of bytes to check
                              144E  5748 240$:   $DS_BREAK
      00010058 9F    6E   FA  144E                        CALLG   (SP), a#DS$BREAK
           0000213B'EF    16  1455  5749         JSB     CHECK_PACKET            ; go check data packet
                              145B  5750         $DS_BNCOMPLETE  260$            ; br = no error
                    24 50  E9  145B                        BLBC    R0, 260$
                              145E  5751         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=DATA_ERR_DATA
           00001E75'EF    DF  145E                        PUSHAL  DATA_ERR_DATA
           00001931'EF    DF  1464                        PUSHAL  T_RD_REC_ERR
                      00  DD  146A                        PUSHL   #0
                      09  DD  146C                        PUSHL   #$ER
                              146E       ;;; TEST 10, SUBTEST 9, ERROR 9
      000100D0 9F    04   FB  146E                        CALLS   #$$M, a#DS$ERRHARD
                              1475  5752         $DS_BNCOMPLETE  250$
                    03 50  E9  1475                        BLBC    R0, 250$
                              1478  5753         $DS_ABORT       TEST
                      50  D4  1478                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                          04  147A                        RET                     ; TERMINATE TEST
                              147B  5754 250$:   $DS_ABORT
      00010020 9F    6C   FA  147B                        CALLG   (AP), a#DS$ABORT
                              1482  5755                                          ; check end packet
      5B   00000084 8F    C0  1482  5756 260$:   ADDL2   #132,R11                ; adjust pointer to next packet
                5A   93  DE  1489  5757         MOVAL   a(R3)+,R10              ; load address of expected end packet
                5C   0E  D0  148C  5758         MOVL    #14,R12                 ; load number of bytes to check
                              148F  5759         $DS_BREAK
      00010058 9F    6E   FA  148F                        CALLG   (SP), a#DS$BREAK
           0000213B'EF    16  1496  5760         JSB     CHECK_PACKET            ; go check end packet
                              149C  5761         $DS_BNCOMPLETE  270$            ; br = no error
                    24 50  E9  149C                        BLBC    R0, 270$
                              149F  5762         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=DATA_ERR_END
           00001E9D'EF    DF  149F                        PUSHAL  DATA_ERR_END
           00001931'EF    DF  14A5                        PUSHAL  T_RD_REC_ERR
                      00  DD  14AB                        PUSHL   #0
                      0A  DD  14AD                        PUSHL   #$ER
                              14AF       ;;; TEST 10, SUBTEST 9, ERROR 10
      000100D0 9F    04   FB  14AF                        CALLS   #$$M, a#DS$ERRHARD
                              14B6  5763         $DS_BNCOMPLETE  265$
                    03 50  E9  14B6                        BLBC    R0, 265$
                              14B9  5764         $DS_ABORT       TEST
                      50  D4  14B9                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                          04  14BB                        RET                     ; TERMINATE TEST
                              14BC  5765 265$:   $DS_ABORT
      00010020 9F    6C   FA  14BC                        CALLG   (AP), a#DS$ABORT
FEC5 00000004'EF   01   01  9D  14C3  5766 270$:   ACBB    #1,#1,B_COUNT1,170$     ; br = not finished reading
                              14CD  5767
                              14CD  5768
                              14CD  5769
                              14CD  5770
                              14CD  5771         $DS_ENDSUB
                              14CD       T10_S9_X:
```

```
00010038 9F   00000084'EF   FA  14CD                        CALLG   $S$, a#DS$ENDSUB
                            14D8  5772
                            14D8  5773          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 10.10:   BLOCK WRITE - READ
                ;+
                ; SUBTEST DESCRIPTION:
                ;
                ;       This subtest sends the TU58 controller a series of command packets
                ;       that will cause head switches, forward seeks, reverse seeks and
                ;       seeks with head switches during read and write operations on
                ;       blocks. All data written is read and checked. All end packets
                ;       are checked as the subtest progresses. If any errors occur they are
                ;       reported.
                ;
                ;
                ; SUBTEST STEPS:
                ;
                ;       SUBTEST BLOCK WRITE - READ
                ;       :  DO for count = 1 to 5
                ;       :  :  Point to write command packet
                ;       :  :  Clear buffer
                ;       :  :  REPEAT
                ;       :  :  :  Send command packet byte at a time
                ;       :  :  :  Set timer
                ;       :  :  :  IF timer expired AND no response
                ;       :  :  :  :  THEN
                ;       :  :  :  :  Report no response error
                ;       :  :  :  :  Exit test
                ;       :  :  :  ENDIF
                ;       :  :  : UNTIL all bytes sent
                ;       :  :  ENDREPEAT
                ;       :  :  DO for count = 1 to 4
                ;       :  :  :  Wait for continue
                ;       :  :  :  Set timer
                ;       :  :  :  IF timer expired AND no continue
                ;       :  :  :  :  THEN
                ;       :  :  :  :  Report no continue error
                ;       :  :  :  :  Exit test
                ;       :  :  :  ENDIF
                ;       :  :  :  Point to data packet
                ;       :  :  :  REPEAT
                ;       :  :  :  :  Send data packet byte at a time
                ;       :  :  :  :  Set timer
                ;       :  :  :  :  IF timer expired AND no response
                ;       :  :  :  :  :  THEN
                ;       :  :  :  :  :  Report no response error
                ;       :  :  :  :  :  Exit test
                ;       :  :  :  :  ENDIF
                ;       :  :  :  : UNTIL all bytes sent
                ;       :  :  :  ENDREPEAT
                ;       :  :  ENDDO
                ;       :  :  REPEAT
                ;       :  :  :  Set timer
                ;       :  :  :  IF timer expired AND done set
                ;       :  :  :  :  THEN
                ;       :  :  :  :  :  Read byte
                ;       :  :  :  ENDIF
                ;       :  :  : UNTIL timer expired AND done clear
```

```
14D8  5830 ;        :  :  ENDREPEAT
14D8  5831 ;        :  :  IF expected byte count NEQ actual byte count
14D8  5832 ;        :  :  : THEN
14D8  5833 ;        :  :  :  : Report error
14D8  5834 ;        :  :  :  : Exit test
14D8  5835 ;        :  :  ENDIF
14D8  5836 ;        :  :  REPEAT
14D8  5837 ;        :  :  :  Point to expected end packet
14D8  5838 ;        :  :  :  IF expected end data NEQ received end data
14D8  5839 ;        :  :  :  : THEN
14D8  5840 ;        :  :  :  : Report end packet data error
14D8  5841 ;        :  :  :  ENDIF
14D8  5842 ;        :  :  : UNTIL all data checked
14D8  5843 ;        :  :  ENDREPEAT
14D8  5844 ;        :  :  Point to read command packet
14D8  5845 ;        :  :  REPEAT
14D8  5846 ;        :  :  :  Send command packet byte at a time
14D8  5847 ;        :  :  :  Set timer
14D8  5848 ;        :  :  :  IF timer expired and no response
14D8  5849 ;        :  :  :  : THEN
14D8  5850 ;        :  :  :  : Report no response error
14D8  5851 ;        :  :  :  : Exit test
14D8  5852 ;        :  :  :  ENDIF
14D8  5853 ;        :  :  : UNTIL all bytes sent
14D8  5854 ;        :  :  ENDREPEAT
14D8  5855 ;        :  :  REPEAT
14D8  5856 ;        :  :  :  Set timer
14D8  5857 ;        :  :  :  IF timer expired AND done set
14D8  5858 ;        :  :  :  : THEN
14D8  5859 ;        :  :  :  : :  Read byte
14D8  5860 ;        :  :  :  ENDIF
14D8  5861 ;        :  :  : UNTIL timer expired AND done clear
14D8  5862 ;        :  :  ENDREPEAT
14D8  5863 ;        :  :  IF expected byte count NEQ actual byte count
14D8  5864 ;        :  :  :  THEN
14D8  5865 ;        :  :  :  : Report error
14D8  5866 ;        :  :  :  : Exit test
14D8  5867 ;        :  :  ENDIF
14D8  5868 ;        :  :  REPEAT
14D8  5869 ;        :  :  :  Point to expected data packet
14D8  5870 ;        :  :  :  REPEAT
14D8  5871 ;        :  :  :  : IF data expected NEQ data received
14D8  5872 ;        :  :  :  : : THEN
14D8  5873 ;        :  :  :  : : Report data error
14D8  5874 ;        :  :  :  : : Exit subtest
14D8  5875 ;        :  :  :  : ENDIF
14D8  5876 ;        :  :  :  : Point to next byte of data
14D8  5877 ;        :  :  :  : UNTIL all data in packet checked
14D8  5878 ;        :  :  :  ENDREPEAT
14D8  5879 ;        :  :  : UNTIL 4 data packets checked
14D8  5880 ;        :  :  ENDREPEAT
14D8  5881 ;        :  :  Point to expected end packet
14D8  5882 ;        :  :  REPEAT
14D8  5883 ;        :  :  :  IF data expected NEQ data received
14D8  5884 ;        :  :  :  : THEN
```

```
                                14D8  5885 ;       :  :  :  :  Report data error
                                14D8  5886 ;       :  :  :  :  Exit subtest
                                14D8  5887 ;       :  :  :  ENDIF
                                14D8  5888 ;       :  :  : UNTIL all end packet bytes checked
                                14D8  5889 ;       :  :  ENDREPEAT
                                14D8  5890 ;       :  ENDDO
                                14D8  5891 ;       ENDSUBTEST BLOCK WRITE - READ
                                14D8  5892 ;
                                14D8  5893 ;
                                14D8  5894 ;.page
                                14D8  5895 ;-
                                14D8  5896         $DS_BGNSUB
                                14D8       T10_S10::
00010030 9F   00000090'EF   FA  14D8                    CALLG   $S$, a#DS$BGNSUB
         00000001'EF   94  14E3  5897          CLRB    B_FLAGS2                ; initialize repeat flag
    00000001'EF   06  88  14E9  5898          BISB2   #<M_REPEAT_SEND+M_REPEAT_CHECK>,B_FLAGS2
         00000004'EF   94  14F0  5899          CLRB    B_COUNT1                ; initialize command counter
    53   000013D3'EF   9E  14F6  5900          MOVAB   COMMAND_TBL_3,R3        ; load pointer to command table
                           14FD  5901                                          ; clear buffers
         00000000'EF   94  14FD  5902 10$:     CLRB    B_FLAGS                 ; initialize flags
    58   00000000'FF   9E  1503  5903          MOVAB   aA_BUFFER_BEGIN,R8      ; load buffer starting address
    59   00000600 8F   D0  150A  5904          MOVL    #BUFFER_SIZE,R9         ; do all pages
         00002134'EF   16  1511  5905          JSB     CLEAR_BUFFER            ; go clear buffers
                       1517  5906                                              ; send write command
    54   FFF3CB00 8F   D0  1517  5907          MOVL    #DELAY_TIME3,R4         ; load send packet delay time
             55   93   DE  151E  5908          MOVAL   a(R3)+,R5               ; point to write command packet
             57   0E   D0  1521  5909          MOVL    #14,R7                  ; load transfer byte count
         0000203D'EF   16  1524  5910          JSB     SEND_TU58               ; send command packet
24 00000000'EF   00   E1  152A  5911          BBC     #V_CLOCK_FLAG,B_FLAGS,30$ ; br = no timeout error
                       1532  5912          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=NO_READY
         00001BEB'EF   DF  1532                  PUSHAL  NO_READY
         000018C8'EF   DF  1538                  PUSHAL  T_WR_BLK_ERR
                  00   DD  153E                  PUSHL   #0
                  01   DD  1540                  PUSHL   #$ER
                       1542       ;;; TEST 10, SUBTEST 10, ERROR 1
000100D0 9F   04   FB  1542                     CALLS   #$$M, a#DS$ERRHARD
                       1549  5913          $DS_BNCOMPLETE  20$
             03 50   E9  1549                  BLBC    R0, 20$
                       154C  5914          $DS_ABORT       TEST
                  50   D4  154C                  CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                       154E                  RET                             ; TERMINATE TEST
                       154F  5915 20$:     $DS_ABORT
00010020 9F   6C   FA  154F                     CALLG   (AP), a#DS$ABORT
                       1556  5916                                              ; read continue
         00000003'EF   94  1556  5917 30$:     CLRB    B_COUNT                 ; initialize data packet counter
54   FF7E4CE0 8F   D0  155C  5918 35$:     MOVL    #DELAY_TIME7,R4         ; load receive packet delay time
55   00000000'FF   9E  1563  5919          MOVAB   aA_BUFFER_BEGIN,R5      ; load buffer address to store data
    57   55   01   C1  156A  5920          ADDL3   #1,R5,R7                ; load last expected address of data
         00002083'EF   16  156E  5921          JSB     RECEIVE_TU58            ; go get data from TU58
5A   00000023'EF   9E  1574  5922          MOVAB   B_CONTINUE,R10          ; load address of expected continue
5B   00000000'FF   9E  157B  5923          MOVAB   aA_BUFFER_BEGIN,R11     ; load address of buffer
             57   55   D1  1582  5924          CMPL    R5,R7                   ; check for correct number of bytes
                  2A   13  1585  5925          BEQL    70$                     ; br = correct number of bytes
                       1587  5926 37$:     $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=REC_ERR,-
                       1587  5927                          P1=#T_REC_CONT
```

```
                00001D47'8F   DD  1587                      PUSHL   #T_REC_CONT
                00001EB4'EF   DF  158D                      PUSHAL  REC_ERR
                000018C8'EF   DF  1593                      PUSHAL  T_WR_BLK_ERR
                          00  DD  1599                      PUSHL   #0
                          02  DD  159B                      PUSHL   #$ER
                              159D        ;;; TEST 10, SUBTEST 10, ERROR 2
      000100D0 9F         05  FB  159D                      CALLS   #$$M, a#DS$ERRHARD
                              15A4  5928          $DS_BNCOMPLETE  40$
                       03 50  E9  15A4                      BLBC    R0, 40$
                              15A7  5929          $DS_ABORT       TEST
                          50  D4  15A7                      CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                              04  15A9                      RET                         ; TERMINATE TEST
                              15AA  5930
                              15AA  5931 40$:     $DS_ABORT
      00010020 9F         6C  FA  15AA                      CALLG   (AP), a#DS$ABORT
                              15B1  5932                                              ; check continue
                    5C    01  D0  15B1  5933 70$:     MOVL    #1,R12                  ; load number of bytes to check
                              15B4  5934          $DS_BREAK
      00010058 9F         6E  FA  15B4                      CALLG   (SP), a#DS$BREAK
                00002138'EF   16  15BB  5935          JSB     CHECK_PACKET            ; go check continue
                              15C1  5936          $DS_BNCOMPLETE  90$                 ; br = no error
                       24 50  E9  15C1                      BLBC    R0, 90$
                              15C4  5937          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=DATA_ERR_CONT
                00001E4D'EF   DF  15C4                      PUSHAL  DATA_ERR_CONT
                000018C8'EF   DF  15CA                      PUSHAL  T_WR_BLK_ERR
                          00  DD  15D0                      PUSHL   #0
                          03  DD  15D2                      PUSHL   #$ER
                              15D4        ;;; TEST 10, SUBTEST 10, ERROR 3
      000100D0 9F         04  FB  15D4                      CALLS   #$$M, a#DS$ERRHARD
                              15DB  5938          $DS_BNCOMPLETE  80$
                       03 50  E9  15DB                      BLBC    R0, 80$
                              15DE  5939          $DS_ABORT       TEST
                          50  D4  15DE                      CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                              04  15E0                      RET                         ; TERMINATE TEST
                              15E1  5940 80$:     $DS_ABORT
      00010020 9F         6C  FA  15E1                      CALLG   (AP), a#DS$ABORT
                              15E8  5941                                              ; send data packet
      54    FFFB6C20 8F         D0  15E8  5942 90$:     MOVL    #DELAY_TIME1,R4         ; load send packet delay time
                    55    93  DE  15EF  5943          MOVAL   a(R3)+,R5               ; point to data packet
      57    00000084 8F         D0  15F2  5944          MOVL    #132,R7                 ; load transfer byte count
                00002039'EF   16  15F9  5945          JSB     SEND_TU58               ; send data packet
   24 00000000'EF         00  E1  15FF  5946          BBC     #V_CLOCK_FLAG,B_FLAGS,110$ ; br = no timeout error
                              1607  5947          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=NO_READY
                00001BEB'EF   DF  1607                      PUSHAL  NO_READY
                000018C8'EF   DF  160D                      PUSHAL  T_WR_BLK_ERR
                          00  DD  1613                      PUSHL   #0
                          04  DD  1615                      PUSHL   #$ER
                              1617        ;;; TEST 10, SUBTEST 10, ERROR 4
      000100D0 9F         04  FB  1617                      CALLS   #$$M, a#DS$ERRHARD
                              161E  5948          $DS_BNCOMPLETE  100$
                       03 50  E9  161E                      BLBC    R0, 100$
                              1621  5949          $DS_ABORT       TEST
                          50  D4  1621                      CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                              04  1623                      RET                         ; TERMINATE TEST
                              1624  5950 100$:    $DS_ABORT
```

```
          00010020 9F    6C   FA  1624                        CALLG   (AP), a#DS$ABORT
                                  162B  5951
                 00000000'FF   94  162B  5952 110$:   CLRB    @A_BUFFER_BEGIN          ; clear buffer used to store continue
   FF21 00000003'EF    01   03   9D  1631  5953         ACBB    #3,#1,B_COUNT,35$        ; br = not finished
        10 00000001'EF    01   E1  163B  5954 112$:   BBC     #V_REPEAT_SEND,B_FLAGS2,115$ ; br =  not repeating
                 00000003'EF   94  1643  5955         CLRB    B_COUNT                  ; initialize counter to repeat
          00000001'EF    02   8A  1649  5956         BICB2   #M_REPEAT_SEND,B_FLAGS2  ; init repeat flag to stop repeating
                       FF09   31  1650  5957         BRW     35$                      ; finish sending data
                                  1653  5958                                          ; read end packet
          54   FFE17B80 8F   D0  1653  5959 115$:   MOVL    #DELAY_TIME5,R4          ; load receive packet delay time
          55   00000000'FF   9E  165A  5960         MOVAB   @A_BUFFER_BEGIN,R5       ; load buffer address to store data
              57    55   0E   C1  1661  5961         ADDL3   #14,R5,R7                ; load last expected address of data
                 00002083'EF   16  1665  5962         JSB     RECEIVE_TU58             ; go get data from TU58
                     5A   93   DE  166B  5963         MOVAL   @(R3)+,R10               ; load address of expected end packet
          5B   00000000'FF   9E  166E  5964         MOVAB   @A_BUFFER_BEGIN,R11      ; load address of actual end packet
                     57   55   D1  1675  5965         CMPL    R5,R7                    ; check for correct number of bytes
                          31   13  1678  5966         BEQL    150$                     ; br = correct number of bytes
          00000000'EF    08   88  167A  5967         BISB2   #M_END_FLAG,B_FLAGS      ; set end error flag
                                  1681  5968 117$:   $DS_ERRHARD_S    ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=REC_ERR,-
                                  1681  5969                          P1=#T_REC_END
                 00001D2E'8F   DD  1681                        PUSHL   #T_REC_END
                 00001EB4'EF   DF  1687                        PUSHAL  REC_ERR
                 000018C8'EF   DF  168D                        PUSHAL  T_WR_BLK_ERR
                          00   DD  1693                        PUSHL   #0
                          05   DD  1695                        PUSHL   #$ER
                                  1697       ;;; TEST 10, SUBTEST 10, ERROR 5
          000100D0 9F    05   FB  1697                        CALLS   #$$M, a#DS$ERRHARD
                                  169E  5970         $DS_BNCOMPLETE  120$
                       03 50   E9  169E                        BLBC    R0, 120$
                                  16A1  5971         $DS_ABORT       TEST
                          50   D4  16A1                        CLRL    R0                ; SEND A WARNING TO THE SUPERVISOR
                          04       16A3                        RET                       ; TERMINATE TEST
                                  16A4  5972
                                  16A4  5973 120$:   $DS_ABORT
          00010020 9F    6C   FA  16A4                        CALLG   (AP), a#DS$ABORT
                                  16AB  5974                                          ; check end packet
                     5C   0E   D0  16AB  5975 150$:   MOVL    #14,R12                  ; load number of bytes to check
                                  16AE  5976         $DS_BREAK
          00010058 9F    6E   FA  16AE                        CALLG   (SP), a#DS$BREAK
                 0000213B'EF   16  16B5  5977         JSB     CHECK_PACKET             ; go check end packet
                                  16BB  5978         $DS_BNCOMPLETE  160$             ; br = no error
                       24 50   E9  16BB                        BLBC    R0, 160$
                                  16BE  5979         $DS_ERRHARD_S    ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=DATA_ERR_END
                 00001E9D'EF   DF  16BE                        PUSHAL  DATA_ERR_END
                 000018C8'EF   DF  16C4                        PUSHAL  T_WR_BLK_ERR
                          00   DD  16CA                        PUSHL   #0
                          06   DD  16CC                        PUSHL   #$ER
                                  16CE       ;;; TEST 10, SUBTEST 10, ERROR 6
          000100D0 9F    04   FB  16CE                        CALLS   #$$M, a#DS$ERRHARD
                                  16D5  5980         $DS_BNCOMPLETE  155$
                       03 50   E9  16D5                        BLBC    R0, 155$
                                  16D8  5981         $DS_ABORT       TEST
                          50   D4  16D8                        CLRL    R0                ; SEND A WARNING TO THE SUPERVISOR
                          04       16DA                        RET                       ; TERMINATE TEST
                                  16DB  5982 155$:   $DS_ABORT
```

```
                00010020 9F   6C    FA  16DB                        CALLG   (AP), a#DS$ABORT
                                    16E2  5983                                              ; clear buffers
                     00000000'EF    94  16E2  5984 160$:   CLRB    B_FLAGS                  ; initialize flags
                58   00000000'FF    9E  16E8  5985           MOVAB   aA_BUFFER_BEGIN,R8       ; load buffer starting address
                59   00000600 8F    D0  16EF  5986           MOVL    #BUFFER_SIZE,R9          ; do all pages
                     00002134'EF    16  16F6  5987           JSB     CLEAR_BUFFER             ; go clear buffers
                                    16FC  5988                                              ; send read command
                54   FFFB6C20 8F    D0  16FC  5989           MOVL    #DELAY_TIME1,R4          ; load send packet delay time
                          55   93   DE  1703  5990           MOVAL   a(R3)+,R5                ; point to read command packet
                          57   0E   D0  1706  5991           MOVL    #14,R7                   ; load transfer byte count
                     0000203D'EF    16  1709  5992           JSB     SEND_TU58                ; send command packet
             24 00000000'EF   00    E1  170F  5993           BBC     #V_CLOCK_FLAG,B_FLAGS,190$ ; br = no timeout error
                                    1717  5994           $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=NO_READY
                     00001BEB'EF    DF  1717                        PUSHAL  NO_READY
                     000018EB'EF    DF  171D                        PUSHAL  T_RD_BLK_ERR
                               00   DD  1723                        PUSHL   #0
                               07   DD  1725                        PUSHL   #$ER
                                    1727               ;;; TEST 10, SUBTEST 10, ERROR 7
                000100D0 9F    04   FB  1727                        CALLS   #$$M, a#DS$ERRHARD
                                    172E  5995           $DS_BNCOMPLETE  180$
                          03 50    E9  172E                        BLBC    R0, 180$
                                    1731  5996           $DS_ABORT       TEST
                               50   D4  1731                        CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                                    04  1733                        RET                      ; TERMINATE TEST
                                    1734  5997 180$:     $DS_ABORT
                00010020 9F   6C    FA  1734                        CALLG   (AP), a#DS$ABORT
                                    173B  5998                                              ; read data and end packets
                54   FFF3CB00 8F    D0  173B  5999 190$:   MOVL    #DELAY_TIME3,R4          ; load receive packet delay time
                55   00000000'FF    9E  1742  6000           MOVAB   aA_BUFFER_BEGIN,R5       ; load buffer address to store data
             57 55   00000210 8F    C1  1749  6001           ADDL3   #528,R5,R7               ; load last expected address of data
          07 00000001'EF    02    E1  1751  6002           BBC     #V_REPEAT_CHECK,B_FLAGS2,195$ ; br = not repeating
                57   00000210 8F    C0  1759  6003           ADDL2   #528,R7                  ; must double buffer if repeating
                          57   0E   C0  1760  6004 195$:     ADDL2   #14,R7                   ; make last address include end packet
                     00002083'EF    16  1763  6005           JSB     RECEIVE_TU58             ; go get data from TU58
                5B   00000000'FF    9E  1769  6006           MOVAB   aA_BUFFER_BEGIN,R11      ; load address of actual data
                          5A   93   DE  1770  6007           MOVAL   a(R3)+,R10               ; load address of expected data
                          57   55   D1  1773  6008           CMPL    R5,R7                    ; check for correct number of bytes
                               31   13  1776  6009           BEQL    230$                     ; br = correct number of bytes
                00000000'EF    04   88  1778  6010           BISB2   #M_DATA_FLAG,B_FLAGS     ; set data error flag
                                    177F  6011 197$:     $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=REC_ERR,-
                                    177F  6012                           P1=#T_REC_DATA
                     00001D68'8F    DD  177F                        PUSHL   #T_REC_DATA
                     00001EB4'EF    DF  1785                        PUSHAL  REC_ERR
                     000018EB'EF    DF  178B                        PUSHAL  T_RD_BLK_ERR
                               00   DD  1791                        PUSHL   #0
                               08   DD  1793                        PUSHL   #$ER
                                    1795               ;;; TEST 10, SUBTEST 10, ERROR 8
                000100D0 9F    05   FB  1795                        CALLS   #$$M, a#DS$ERRHARD
                                    179C  6013           $DS_BNCOMPLETE  200$
                          03 50    E9  179C                        BLBC    R0, 200$
                                    179F  6014           $DS_ABORT       TEST
                               50   D4  179F                        CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                                    04  17A1                        RET                      ; TERMINATE TEST
                                    17A2  6015
                                    17A2  6016 200$:     $DS_ABORT
```

```
        00010020 9F   6C   FA  17A2                          CALLG   (AP), a#DS$ABORT
                                17A9  6017                                          ; check data packets
             00000006'EF   D4  17A9  6018 230$:   CLRL    L_COUNT                  ; clear counter to check 4 packets
        5C   00000084 8F   D0  17AF  6019         MOVL    #132,R12                 ; load number of bytes to check
                                17B6  6020 240$:   $DS_BREAK
        00010058 9F   6E   FA  17B6                          CALLG   (SP), a#DS$BREAK
             0000213B'EF   16  17BD  6021         JSB     CHECK_PACKET             ; go check data packet
                                17C3  6022         $DS_BNCOMPLETE  260$             ; br = no error
                   24 50   E9  17C3                          BLBC    R0, 260$
                                17C6  6023         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=DATA_ERR_DATA
             00001E75'EF   DF  17C6                          PUSHAL  DATA_ERR_DATA
             000018EB'EF   DF  17CC                          PUSHAL  T_RD_BLK_ERR
                      00   DD  17D2                          PUSHL   #0
                      09   DD  17D4                          PUSHL   #$ER
                                17D6       ;;; TEST 10, SUBTEST 10, ERROR 9
        000100D0 9F   04   FB  17D6                          CALLS   #$$M, a#DS$ERRHARD
                                17DD  6024         $DS_BNCOMPLETE  250$
                   03 50   E9  17DD                          BLBC    R0, 250$
                                17E0  6025         $DS_ABORT       TEST
                      50   D4  17E0                          CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                           04  17E2                          RET                      ; TERMINATE TEST
                                17E3  6026 250$:   $DS_ABORT
        00010020 9F   6C   FA  17E3                          CALLG   (AP), a#DS$ABORT
        5B   00000084 8F   C0  17EA  6027 260$:   ADDL2   #132,R11                 ; adjust pointer to next packet
                   5A   93  DE  17F1  6028         MOVAL   a(R3)+,R10               ; load address of expected data
     BA 00000006'EF   03   F3  17F4  6029         AOBLEQ  #3,L_COUNT,240$          ; br = not finished checking data
     0F 00000001'EF   02   E1  17FC  6030         BBC     #V_REPEAT_CHECK,B_FLAGS2,265$ ; br = not repeating
             00000006'EF   D4  1804  6031         CLRL    L_COUNT                  ; initialize check counter
             00000001'EF   94  180A  6032         CLRB    B_FLAGS2                 ; clear repeat flag to stop repeating
                    FFA3   31  1810  6033         BRW     240$                     ; check rest of data packets
                                1813  6034                                          ; check end packet
                   5C   0E  D0  1813  6035 265$:   MOVL    #14,R12                  ; load number of bytes to check
                                1816  6036         $DS_BREAK
        00010058 9F   6E   FA  1816                          CALLG   (SP), a#DS$BREAK
             0000213B'EF   16  181D  6037         JSB     CHECK_PACKET             ; go check end packet
                                1823  6038         $DS_BNCOMPLETE  275$             ; br = no error
                   24 50   E9  1823                          BLBC    R0, 275$
                                1826  6039         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=DATA_ERR_END
             00001E9D'EF   DF  1826                          PUSHAL  DATA_ERR_END
             000018EB'EF   DF  182C                          PUSHAL  T_RD_BLK_ERR
                      00   DD  1832                          PUSHL   #0
                      0A   DD  1834                          PUSHL   #$ER
                                1836       ;;; TEST 10, SUBTEST 10, ERROR 10
        000100D0 9F   04   FB  1836                          CALLS   #$$M, a#DS$ERRHARD
                                183D  6040         $DS_BNCOMPLETE  270$
                   03 50   E9  183D                          BLBC    R0, 270$
                                1840  6041         $DS_ABORT       TEST
                      50   D4  1840                          CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                           04  1842                          RET                      ; TERMINATE TEST
                                1843  6042 270$:   $DS_ABORT
        00010020 9F   6C   FA  1843                          CALLG   (AP), a#DS$ABORT
  FCA9 00000004'EF   01   04  9D  184A  6043 275$:   ACBB    #4,#1,B_COUNT1,10$       ; br = not finished executing test
                                1854  6044
                                1854  6045
                                1854  6046         $DS_ENDSUB
```

```
                        1854        T10_S10_X:
00010038 9F   00000090'EF   FA  1854                    CALLG   $S$, a#DS$ENDSUB
                            185F  6047
                            185F  6048          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 10.11:  RECORD WRITE - READ
                ;*
                ; SUBTEST DESCRIPTION:
                ;
                ;       This subtest sends the TU58 controller a series of command packets
                ;       that will cause head switches, forward seeks, reverse seeks and
                ;       seeks with head switches durring read and write operations on
                ;       records. All data written is read and checked. All end packets
                ;       are checked as the subtest progresses. If any errors occur they are
                ;       reported.
                ;
                ;
                ; SUBTEST STEPS:
                ;
                ;       SUBTEST RECORD WRITE - READ
                ;       : DO for count = 1 to 5
                ;       : : Point to write command packet
                ;       : : Clear buffer
                ;       : : REPEAT
                ;       : : : Send command packet byte at a time
                ;       : : : Set timer
                ;       : : : IF timer expired AND no response
                ;       : : : : THEN
                ;       : : : : Report no response error
                ;       : : : : Exit test
                ;       : : : ENDIF
                ;       : : : UNTIL all bytes sent
                ;       : : ENDREPEAT
                ;       : : DO for count = 1 to 2
                ;       : : : Wait for continue
                ;       : : : Set timer
                ;       : : : IF timer expired AND no continue
                ;       : : : : THEN
                ;       : : : : Report no continue error
                ;       : : : : Exit test
                ;       : : : ENDIF
                ;       : : : Point to data packet
                ;       : : : REPEAT
                ;       : : : : Send data packet byte at a time
                ;       : : : : Set timer
                ;       : : : : IF timer expired AND no response
                ;       : : : : : THEN
                ;       : : : : : Report no response error
                ;       : : : : : Exit test
                ;       : : : : ENDIF
                ;       : : : : UNTIL all bytes sent
                ;       : : : ENDREPEAT
                ;       : : ENDDO
                ;       : : REPEAT
                ;       : : : Set timer
                ;       : : : IF timer expired AND done set
                ;       : : : : THEN
                ;       : : : : : Read byte
                ;       : : : ENDIF
                ;       : : : UNTIL timer expired AND done clear
```

```
185F  6105 ;        :  :  ENDREPEAT
185F  6106 ;        :  :  IF expected byte count NEQ actual byte count
185F  6107 ;        :  :  :  THEN
185F  6108 ;        :  :  :  :  Report error
185F  6109 ;        :  :  :  :  Exit test
185F  6110 ;        :  :  ENDIF
185F  6111 ;        :  :  REPEAT
185F  6112 ;        :  :  :  Point to expected end packet
185F  6113 ;        :  :  :  IF expected end data NEQ received end data
185F  6114 ;        :  :  :  :  THEN
185F  6115 ;        :  :  :  :  Report end packet data error
185F  6116 ;        :  :  :  ENDIF
185F  6117 ;        :  :  : UNTIL all data checked
185F  6118 ;        :  :  ENDREPEAT
185F  6119 ;        :  :  Point to read command packet
185F  6120 ;        :  :  REPEAT
185F  6121 ;        :  :  :  Send command packet byte at a time
185F  6122 ;        :  :  :  Set timer
185F  6123 ;        :  :  :  IF timer expired and no response
185F  6124 ;        :  :  :  :  THEN
185F  6125 ;        :  :  :  :  Report no response error
185F  6126 ;        :  :  :  :  Exit test
185F  6127 ;        :  :  :  ENDIF
185F  6128 ;        :  :  : UNTIL all bytes sent
185F  6129 ;        :  :  ENDREPEAT
185F  6130 ;        :  :  REPEAT
185F  6131 ;        :  :  :  Set timer
185F  6132 ;        :  :  :  IF timer expired AND done set
185F  6133 ;        :  :  :  :  THEN
185F  6134 ;        :  :  :  :  :  Read byte
185F  6135 ;        :  :  :  ENDIF
185F  6136 ;        :  :  : UNTIL timer expired AND done clear
185F  6137 ;        :  :  ENDREPEAT
185F  6138 ;        :  :  IF expected byte count NEQ actual byte count
185F  6139 ;        :  :  :  THEN
185F  6140 ;        :  :  :  :  Report error
185F  6141 ;        :  :  :  :  Exit test
185F  6142 ;        :  :  ENDIF
185F  6143 ;        :  :  REPEAT
185F  6144 ;        :  :  :  Point to expected data packet
185F  6145 ;        :  :  :  REPEAT
185F  6146 ;        :  :  :  :  IF data expected NEQ data received
185F  6147 ;        :  :  :  :  :  THEN
185F  6148 ;        :  :  :  :  :  Report data error
185F  6149 ;        :  :  :  :  :  Exit subtest
185F  6150 ;        :  :  :  :  ENDIF
185F  6151 ;        :  :  :  :  Point to next byte of data
185F  6152 ;        :  :  :  : UNTIL all data in packet checked
185F  6153 ;        :  :  :  ENDREPEAT
185F  6154 ;        :  :  : UNTIL 4 data packets checked
185F  6155 ;        :  :  ENDREPEAT
185F  6156 ;        :  :  Point to expected end packet
185F  6157 ;        :  :  REPEAT
185F  6158 ;        :  :  :  IF data expected NEQ data received
185F  6159 ;        :  :  :  :  THEN
```

```
                                185F  6160 ;       : : : : Report data error
                                185F  6161 ;       : : : : Exit subtest
                                185F  6162 ;       : : : ENDIF
                                185F  6163 ;       : : : UNTIL all end packet bytes checked
                                185F  6164 ;       : : ENDREPEAT
                                185F  6165 ;       : ENDDO
                                185F  6166 ;       ENDSUBTEST RECORD WRITE - READ
                                185F  6167 ;
                                185F  6168 ;
                                185F  6169 ;.page
                                185F  6170 ;-
                                185F  6171         $DS_BGNSUB
                                185F       T10_S11::
00010030 9F   0000009C'EF   FA  185F                CALLG   $S$, a#DS$BGNSUB
         00000001'EF   94   186A  6172         CLRB    B_FLAGS2                ; initialize repeat flag
      00000001'EF   06   88   1870  6173         BISB2   #<M_REPEAT_SEND+M_REPEAT_CHECK>,B_FLAGS2
         00000004'EF   94   1877  6174         CLRB    B_COUNT1                ; initialize command counter
      53 000014E3'EF   9E   187D  6175         MOVAB   COMMAND_TBL_4,R3        ; load pointer to command table
                        1884  6176                                             ; clear buffers
         00000000'EF   94   1884  6177 10$:    CLRB    B_FLAGS                 ; initialize flags
      58 00000000'FF   9E   188A  6178         MOVAB   aA_BUFFER_BEGIN,R8      ; load buffer starting address
      59 00000600 8F   D0   1891  6179         MOVL    #BUFFER_SIZE,R9         ; do all pages
         00002134'EF   16   1898  6180         JSB     CLEAR_BUFFER            ; go clear buffers
                        189E  6181                                             ; send write command
      54 FFF3CB00 8F   D0   189E  6182         MOVL    #DELAY_TIME3,R4         ; load send packet delay time
            55   93   DE   18A5  6183         MOVAL   a(R3)+,R5               ; point to write command packet
            57   0E   D0   18A8  6184         MOVL    #14,R7                  ; load transfer byte count
         0000203D'EF   16   18AB  6185         JSB     SEND_TU58               ; send command packet
24 00000000'EF   00   E1   18B1  6186         BBC     #V_CLOCK_FLAG,B_FLAGS,30$ ; br = no timeout error
                        18B9  6187         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
         00001BEB'EF   DF   18B9                        PUSHAL  NO_READY
         0000190D'EF   DF   18BF                        PUSHAL  T_WR_REC_ERR
                  00   DD   18C5                        PUSHL   #0
                  01   DD   18C7                        PUSHL   #$ER
                        18C9       ;;; TEST 10, SUBTEST 11, ERROR 1
000100D0 9F       04   FB   18C9                        CALLS   #$$M, a#DS$ERRHARD
                        18D0  6188         $DS_BNCOMPLETE  20$
               03 50   E9   18D0                        BLBC    R0, 20$
                        18D3  6189         $DS_ABORT       TEST
                  50   D4   18D3                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                  04   18D5                             RET                     ; TERMINATE TEST
                        18D6  6190 20$:    $DS_ABORT
00010020 9F       6C   FA   18D6                        CALLG   (AP), a#DS$ABORT
                        18DD  6191                                             ; read continue
   54 FF7E4CE0 8F   D0   18DD  6192 30$:    MOVL    #DELAY_TIME7,R4         ; load receive packet delay time
   55 00000000'FF   9E   18E4  6193         MOVAB   aA_BUFFER_BEGIN,R5      ; load buffer address to store data
      57   55   01   C1   18EB  6194         ADDL3   #1,R5,R7                ; load last expected address of data
         00002083'EF   16   18EF  6195         JSB     RECEIVE_TU58            ; go get data from TU58
   5A 00000023'EF   9E   18F5  6196         MOVAB   B_CONTINUE,R10          ; load address of expected data
   5B 00000000'FF   9E   18FC  6197         MOVAB   aA_BUFFER_BEGIN,R11     ; load address of actual data
         57   55   D1   1903  6198         CMPL    R5,R7                   ; check for correct number of bytes
                  2A   13   1906  6199         BEQL    70$                     ; br = correct number of bytes
                        1908  6200         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                        1908  6201                         P1=#T_REC_CONT
         00001D47'8F   DD   1908                        PUSHL   #T_REC_CONT
```

```
                00001EB4'EF   DF  190E                          PUSHAL  REC_ERR
                0000190D'EF   DF  1914                          PUSHAL  T_WR_REC_ERR
                          00  DD  191A                          PUSHL   #0
                          02  DD  191C                          PUSHL   #$ER
                              191E        ;;; TEST 10, SUBTEST 11, ERROR 2
           000100D0 9F    05  FB  191E                          CALLS   #$$M, a#DS$ERRHARD
                              1925  6202          $DS_BNCOMPLETE  40$
                       03 50  E9  1925                          BLBC    R0, 40$
                              1928  6203          $DS_ABORT       TEST
                          50  D4  1928                          CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                          04  192A                              RET                     ; TERMINATE TEST
                              192B  6204
                              192B  6205 40$:     $DS_ABORT
           00010020 9F    6C  FA  192B                          CALLG   (AP), a#DS$ABORT
                              1932  6206                                                ; check continue
                    5C    01  D0  1932  6207 70$:     MOVL    #1,R12                  ; load number of bytes to check
                              1935  6208          $DS_BREAK
           00010058 9F    6E  FA  1935                          CALLG   (SP), a#DS$BREAK
                0000213B'EF   16  193C  6209          JSB     CHECK_PACKET            ; go check continue
                              1942  6210          $DS_BNCOMPLETE  90$                 ; br = no error
                       24 50  E9  1942                          BLBC    R0, 90$
                              1945  6211          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_CONT
                00001E4D'EF   DF  1945                          PUSHAL  DATA_ERR_CONT
                0000190D'EF   DF  194B                          PUSHAL  T_WR_REC_ERR
                          00  DD  1951                          PUSHL   #0
                          03  DD  1953                          PUSHL   #$ER
                              1955        ;;; TEST 10, SUBTEST 11, ERROR 3
           000100D0 9F    04  FB  1955                          CALLS   #$$M, a#DS$ERRHARD
                              195C  6212          $DS_BNCOMPLETE  80$
                       03 50  E9  195C                          BLBC    R0, 80$
                              195F  6213          $DS_ABORT       TEST
                          50  D4  195F                          CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                          04  1961                              RET                     ; TERMINATE TEST
                              1962  6214 80$:     $DS_ABORT
           00010020 9F    6C  FA  1962                          CALLG   (AP), a#DS$ABORT
                              1969  6215                                                ; send data packet
           54   FFFB6C20 8F    D0  1969  6216 90$:     MOVL    #DELAY_TIME1,R4         ; load send packet delay time
                     55    93  DE  1970  6217          MOVAL   a(R3)+,R5               ; point to data packet
           57   00000084 8F    D0  1973  6218          MOVL    #132,R7                 ; load transfer byte count
                0000203D'EF   16  197A  6219          JSB     SEND_TU58               ; send data packet
      24 00000000'EF    00  E1  1980  6220          BBC     #V_CLOCK_FLAG,B_FLAGS,110$ ; br = no timeout error
                              1988  6221          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
                00001BEB'EF   DF  1988                          PUSHAL  NO_READY
                0000190D'EF   DF  198E                          PUSHAL  T_WR_REC_ERR
                          00  DD  1994                          PUSHL   #0
                          04  DD  1996                          PUSHL   #$ER
                              1998        ;;; TEST 10, SUBTEST 11, ERROR 4
           000100D0 9F    04  FB  1998                          CALLS   #$$M, a#DS$ERRHARD
                              199F  6222          $DS_BNCOMPLETE  100$
                       03 50  E9  199F                          BLBC    R0, 100$
                              19A2  6223          $DS_ABORT       TEST
                          50  D4  19A2                          CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                          04  19A4                              RET                     ; TERMINATE TEST
                              19A5  6224 100$:    $DS_ABORT
           00010020 9F    6C  FA  19A5                          CALLG   (AP), a#DS$ABORT
```

```
                                19AC  6225
          00000000'FF    94    19AC  6226 110$:   CLRB    @A_BUFFER_BEGIN          ; clear buffer used to store continue
   0A 00000001'EF    01    E1    19B2  6227         BBC     #V_REPEAT_SEND,B_FLAGS2,115$ ; br =  not repeating
      00000001'EF    02    8A    19BA  6228         BICB2   #M_REPEAT_SEND,B_FLAGS2 ; clear repeat flag to stop repeating
                  FF19    31    19C1  6229         BRW     30$                      ; finish sending data
                                19C4  6230                                          ; read end packet
      54   FF7E4CE0 8F    D0    19C4  6231 115$:   MOVL    #DELAY_TIME7,R4          ; load receive packet delay time
      55   00000000'FF    9E    19CB  6232         MOVAB   @A_BUFFER_BEGIN,R5       ; load buffer address to store data
          57    55    0E    C1    19D2  6233         ADDL3   #14,R5,R7                ; load last expected address of data
          00002083'EF    16    19D6  6234         JSB     RECEIVE_TU58             ; go get data from TU58
               5A    93    DE    19DC  6235         MOVAL   @(R3)+,R10               ; load address of expected end packet
      5B   00000000'FF    9E    19DF  6236         MOVAB   @A_BUFFER_BEGIN,R11      ; load address of actual end packet
               57    55    D1    19E6  6237         CMPL    R5,R7                    ; check for correct number of bytes
                     31    13    19E9  6238         BEQL    150$                     ; br = correct number of bytes
      00000000'EF    08    88    19EB  6239         BISB2   #M_END_FLAG,B_FLAGS      ; set end error flag
                                19F2  6240 117$:   $DS_ERRHARD_S    ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                                19F2  6241                          P1=#T_REC_END
          00001D2E'8F    DD    19F2                         PUSHL   #T_REC_END
          00001EB4'EF    DF    19F8                         PUSHAL  REC_ERR
          0000190D'EF    DF    19FE                         PUSHAL  T_WR_REC_ERR
                     00    DD    1A04                         PUSHL   #0
                     05    DD    1A06                         PUSHL   #$ER
                                1A08          ;;; TEST 10, SUBTEST 11, ERROR 5
      000100D0 9F    05    FB    1A08                         CALLS   #$$M, @#DS$ERRHARD
                                1A0F  6242         $DS_BNCOMPLETE  120$
                  03 50    E9    1A0F                         BLBC    R0, 120$
                                1A12  6243         $DS_ABORT       TEST
                     50    D4    1A12                         CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                           04    1A14                         RET                      ; TERMINATE TEST
                                1A15  6244
                                1A15  6245 120$:   $DS_ABORT
      00010020 9F    6C    FA    1A15                         CALLG   (AP), @#DS$ABORT
                                1A1C  6246                                          ; check end packet
               5C    0E    D0    1A1C  6247 150$:   MOVL    #14,R12                  ; load number of bytes to check
                                1A1F  6248         $DS_BREAK
      00010058 9F    6E    FA    1A1F                         CALLG   (SP), @#DS$BREAK
          0000213B'EF    16    1A26  6249         JSB     CHECK_PACKET             ; go check end packet
                                1A2C  6250         $DS_BNCOMPLETE  160$             ; br = no error
                  21 50    E9    1A2C                         BLBC    R0, 160$
                                1A2F  6251         $DS_ERRHARD_S    ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_END
          00001E9D'EF    DF    1A2F                         PUSHAL  DATA_ERR_END
          0000190D'EF    DF    1A35                         PUSHAL  T_WR_REC_ERR
                     00    DD    1A3B                         PUSHL   #0
                     06    DD    1A3D                         PUSHL   #$ER
                                1A3F          ;;; TEST 10, SUBTEST 11, ERROR 6
      000100D0 9F    04    FB    1A3F                         CALLS   #$$M, @#DS$ERRHARD
                                1A46  6252         $DS_BCOMPLETE   160$             ; br = error, but continue
                  07 50    E8    1A46                         BLBS    R0, 160$
                                1A49  6253         $DS_ABORT
      00010020 9F    6C    FA    1A49                         CALLG   (AP), @#DS$ABORT
                                1A50  6254                                          ; clear buffers
          00000000'EF    94    1A50  6255 160$:   CLRB    B_FLAGS                  ; initialize flags
      58   00000000'FF    9E    1A56  6256         MOVAB   @A_BUFFER_BEGIN,R8       ; load buffer starting address
      59   00000600 8F    D0    1A5D  6257         MOVL    #BUFFER_SIZE,R9          ; do all pages
          00002134'EF    16    1A64  6258         JSB     CLEAR_BUFFER             ; go clear buffers
```

```
                                1A6A  6259                                          ; send read command
      54   FFFB6C20 8F   D0    1A6A  6260          MOVL    #DELAY_TIME1,R4         ; load send packet delay time
                55   93   DE    1A71  6261          MOVAL   @(R3)+,R5               ; point to read command packet
                57   0E   D0    1A74  6262          MOVL    #14,R7                  ; load transfer byte count
           0000203D'EF   16    1A77  6263          JSB     SEND_TU58               ; send command packet
   24 00000000'EF   00   E1    1A7D  6264          BBC     #V_CLOCK_FLAG,B_FLAGS,190$ ; br = no timeout error
                                1A85  6265          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=NO_READY
           00001BEB'EF   DF    1A85                        PUSHAL  NO_READY
           00001931'EF   DF    1A8B                        PUSHAL  T_RD_REC_ERR
                    00   DD    1A91                        PUSHL   #0
                    07   DD    1A93                        PUSHL   #$ER
                                1A95        ;;; TEST 10, SUBTEST 11, ERROR 7
      000100D0 9F   04   FB    1A95                        CALLS   #$$M, @#DS$ERRHARD
                                1A9C  6266          $DS_BNCOMPLETE  180$
                 03 50   E9    1A9C                        BLBC    R0, 180$
                                1A9F  6267          $DS_ABORT       TEST
                    50   D4    1A9F                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                         04    1AA1                        RET                     ; TERMINATE TEST
                                1AA2  6268 180$:    $DS_ABORT
      00010020 9F   6C   FA    1AA2                        CALLG   (AP), @#DS$ABORT
                                1AA9  6269                                          ; read data and end packets
      54   FFF3CB00 8F   D0    1AA9  6270 190$:    MOVL    #DELAY_TIME3,R4         ; load receive packet delay time
      55   00000000'FF   9E    1AB0  6271          MOVAB   @A_BUFFER_BEGIN,R5      ; load buffer address to store data
   57 55   00000084 8F   C1    1AB7  6272          ADDL3   #132,R5,R7              ; load last expected address of data
   07 00000001'EF   02   E1    1ABF  6273          BBC     #V_REPEAT_CHECK,B_FLAGS2,195$ ; br = not repeating
      57   00000084 8F   C0    1AC7  6274          ADDL2   #132,R7                 ; must double buffer if repeating
                57   0E   C0    1ACE  6275 195$:    ADDL2   #14,R7                  ; add end packet to address
           00002083'EF   16    1AD1  6276          JSB     RECEIVE_TU58            ; go get data from TU58
      5B   00000000'FF   9E    1AD7  6277          MOVAB   @A_BUFFER_BEGIN,R11     ; load address of buffer
                5A   93   DE    1ADE  6278          MOVAL   @(R3)+,R10              ; load address of expected data
                57   55   D1    1AE1  6279          CMPL    R5,R7                   ; check for correct number of bytes
                    31   13    1AE4  6280          BEQL    230$                    ; br = correct number of bytes
      00000000'EF   04   88    1AE6  6281          BISB2   #M_DATA_FLAG,B_FLAGS    ; set data error flag
                                1AED  6282 197$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=REC_ERR,-
                                1AED  6283                          P1=#T_REC_DATA
           00001D68'8F   DD    1AED                        PUSHL   #T_REC_DATA
           00001EB4'EF   DF    1AF3                        PUSHAL  REC_ERR
           00001931'EF   DF    1AF9                        PUSHAL  T_RD_REC_ERR
                    00   DD    1AFF                        PUSHL   #0
                    08   DD    1B01                        PUSHL   #$ER
                                1B03        ;;; TEST 10, SUBTEST 11, ERROR 8
      000100D0 9F   05   FB    1B03                        CALLS   #$$M, @#DS$ERRHARD
                                1B0A  6284          $DS_BNCOMPLETE  200$
                 03 50   E9    1B0A                        BLBC    R0, 200$
                                1B0D  6285          $DS_ABORT       TEST
                    50   D4    1B0D                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                         04    1B0F                        RET                     ; TERMINATE TEST
                                1B10  6286
                                1B10  6287 200$:    $DS_ABORT
      00010020 9F   6C   FA    1B10                        CALLG   (AP), @#DS$ABORT
                                1B17  6288                                          ; check data packets
      5C   00000084 8F   D0    1B17  6289 230$:    MOVL    #132,R12                ; load number of bytes to check
                                1B1E  6290 240$:    $DS_BREAK
      00010058 9F   6E   FA    1B1E                        CALLG   (SP), @#DS$BREAK
           0000213B'EF   16    1B25  6291          JSB     CHECK_PACKET            ; go check data packet
```

```
                                1B2B  6292          $DS_BNCOMPLETE  260$              ; br = no error
                  24 50   E9    1B2B                BLBC    R0, 260$
                                1B2E  6293          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=DATA_ERR_DATA
          00001E75'EF   DF      1B2E                PUSHAL  DATA_ERR_DATA
          00001931'EF   DF      1B34                PUSHAL  T_RD_REC_ERR
                  00    DD      1B3A                PUSHL   #0
                  09    DD      1B3C                PUSHL   #$ER
                                1B3E          ;;; TEST 10, SUBTEST 11, ERROR 9
      000100D0 9F   04    FB    1B3E                CALLS   #$$M, a#DS$ERRHARD
                                1B45  6294          $DS_BNCOMPLETE  250$
                  03 50   E9    1B45                BLBC    R0, 250$
                                1B48  6295          $DS_ABORT       TEST
                     50   D4    1B48                CLRL    R0                ; SEND A WARNING TO THE SUPERVISOR
                          04    1B4A                RET                       ; TERMINATE TEST
                                1B4B  6296 250$:    $DS_ABORT
      00010020 9F   6C    FA    1B4B                CALLG   (AP), a#DS$ABORT
   5B   00000084 8F   C0    1B52  6297 260$:    ADDL2   #132,R11                  ; adjust pointer to next packet
0C 00000001'EF   02    E1    1B59  6298          BBC     #V_REPEAT_CHECK,B_FLAGS2,265$ ; br = not repeating
        00000001'EF   94    1B61  6299          CLRB    B_FLAGS2                  ; clear repeat flag to stop repeating
           5A   93    DE    1B67  6300          MOVAL   a(R3)+,R10                ; load address of expected data
              FFB1    31    1B6A  6301          BRW     240$                      ; check rest of data packets
                                1B6D  6302                                        ; check end packet
           5A   93    DE    1B6D  6303 265$:    MOVAL   a(R3)+,R10                ; load address of expected end packet
           5C   0E    D0    1B70  6304          MOVL    #14,R12                   ; load number of bytes to check
                                1B73  6305          $DS_BREAK
      00010058 9F   6E    FA    1B73                CALLG   (SP), a#DS$BREAK
           0000213B'EF   16    1B7A  6306          JSB     CHECK_PACKET              ; go check end packet
                                1B80  6307          $DS_BNCOMPLETE  275$              ; br = no error
                  24 50   E9    1B80                BLBC    R0, 275$
                                1B83  6308          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=DATA_ERR_END
          00001E9D'EF   DF      1B83                PUSHAL  DATA_ERR_END
          00001931'EF   DF      1B89                PUSHAL  T_RD_REC_ERR
                  00    DD      1B8F                PUSHL   #0
                  0A    DD      1B91                PUSHL   #$ER
                                1B93          ;;; TEST 10, SUBTEST 11, ERROR 10
      000100D0 9F   04    FB    1B93                CALLS   #$$M, a#DS$ERRHARD
                                1B9A  6309          $DS_BNCOMPLETE  270$
                  03 50   E9    1B9A                BLBC    R0, 270$
                                1B9D  6310          $DS_ABORT       TEST
                     50   D4    1B9D                CLRL    R0                ; SEND A WARNING TO THE SUPERVISOR
                          04    1B9F                RET                       ; TERMINATE TEST
                                1BA0  6311 270$:    $DS_ABORT
      00010020 9F   6C    FA    1BA0                CALLG   (AP), a#DS$ABORT
FCD3 00000004'EF   01    04    9D    1BA7  6312 275$:    ACBB    #4,#1,B_COUNT1,10$      ; br = not finished executing test
                                1BB1  6313
                                1BB1  6314
                                1BB1  6315          $DS_ENDSUB
                                1BB1          T10_S11_X:
 00010038 9F   0000009C'EF   FA    1BB1                CALLG   $S$, a#DS$ENDSUB
                                1BBC  6316          $DS_PAGE
```

```
1BBC                    .SBTTL  SUBTEST 10.12:  WRITE RECORD INTERRUPT
1BBC  6319 ;+
1BBC  6320 ; SUBTEST DESCRIPTION:
1BBC  6321 ;
1BBC  6322 ;       This subtest sends the TU58 a command packet to write one record
1BBC  6323 ;       of 128 bytes in interrupt mode. When an interrupt occurs the write service-
1BBC  6324 ;       ice routine sends the next byte. A timeout occurs after sufficient time
1BBC  6325 ;       has passed to send a full packet, at which time an end packet is
1BBC  6326 ;       read and checked. An error is reported if an interrupt fails to occur
1BBC  6327 ;       before the timer expires and the full packet has not been sent. The data
1BBC  6328 ;       packet sent contains alternating bytes of all one's and all zero's.
1BBC  6329 ;       The data will be read and checked for errors in the next subtest.
1BBC  6330 ;
1BBC  6331 ;
1BBC  6332 ; SUBTEST STEPS:
1BBC  6333 ;
1BBC  6334 ;       SUBTEST WRITE RECORD INTERRUPT
1BBC  6335 ;       :  Clear buffer
1BBC  6336 ;       :  Point to write command packet
1BBC  6337 ;       :  REPEAT
1BBC  6338 ;       :  :  Send command packet byte at a time
1BBC  6339 ;       :  :  Set timer
1BBC  6340 ;       :  :  IF timer expired AND no response
1BBC  6341 ;       :  :  :  THEN
1BBC  6342 ;       :  :  :  Report no response error
1BBC  6343 ;       :  :  :  Exit test
1BBC  6344 ;       :  :  ENDIF
1BBC  6345 ;       :  : UNTIL all bytes sent
1BBC  6346 ;       :  ENDREPEAT
1BBC  6347 ;       :  Wait for continue
1BBC  6348 ;       :  Set timer
1BBC  6349 ;       :  IF timer expired AND no continue
1BBC  6350 ;       :  :  THEN
1BBC  6351 ;       :  :  Report no continue error
1BBC  6352 ;       :  :  Exit test
1BBC  6353 ;       :  ENDIF
1BBC  6354 ;       :  Point to data packet
1BBC  6355 ;       :  Enable send interrupt
1BBC  6356 ;       :  REPEAT
1BBC  6357 ;       :  :  Send data packet byte at a time
1BBC  6358 ;       :  :  Set timer
1BBC  6359 ;       :  :  IF timer expired AND no response
1BBC  6360 ;       :  :  :  THEN
1BBC  6361 ;       :  :  :  :  DISABLE send interrupt
1BBC  6362 ;       :  :  :  :  Report no response error
1BBC  6363 ;       :  :  :  :  Exit test
1BBC  6364 ;       :  :  ENDIF
1BBC  6365 ;       :  : UNTIL all bytes sent
1BBC  6366 ;       :  ENDREPEAT
1BBC  6367 ;       :  DISABLE send interrupt
1BBC  6368 ;       :  REPEAT
1BBC  6369 ;       :  :  Set timer
1BBC  6370 ;       :  :  IF timer expired AND done set
1BBC  6371 ;       :  :  :  THEN
1BBC  6372 ;       :  :  :  :  Read byte
```

```
                                1BBC  6373 ;       :  : ENDIF
                                1BBC  6374 ;       :  : UNTIL timer expired AND done clear
                                1BBC  6375 ;       :  ENDREPEAT
                                1BBC  6376 ;       :  IF expected byte count NEQ actual byte count
                                1BBC  6377 ;       :  : THEN
                                1BBC  6378 ;       :  :  : Report error
                                1BBC  6379 ;       :  :  : Exit test
                                1BBC  6380 ;       :  ENDIF
                                1BBC  6381 ;       :  REPEAT
                                1BBC  6382 ;       :  :  Point to expected end packet
                                1BBC  6383 ;       :  :  IF expected end packet data NEQ received end packet data
                                1BBC  6384 ;       :  :  : THEN
                                1BBC  6385 ;       :  :  : Report end packet data error
                                1BBC  6386 ;       :  :  ENDIF
                                1BBC  6387 ;       :  : UNTIL all data checked
                                1BBC  6388 ;       :  ENDREPEAT
                                1BBC  6389 ;       ENDSUBTEST WRITE RECORD INTERRUPT
                                1BBC  6390 ;
                                1BBC  6391 ;
                                1BBC  6392 ;
                                1BBC  6393 ;.page
                                1BBC  6394 ;-
                                1BBC  6395
                                1BBC  6396          $DS_BGNSUB
                                1BBC          T10_S12::
00010030 9F   000000A8'EF   FA  1BBC                  CALLG   $S$, a#DS$BGNSUB
                                1BC7  6397          $DS_SETVEC_S    VECTOR=#SCB$L_CSTD,SRVADR=WRITE_SERVICE
                      00    DD  1BC7                  PUSHL   #0
              000021D4'EF   DF  1BC9                  PUSHAL  WRITE_SERVICE
              000000F4 8F   DD  1BCF                  PUSHL   #SCB$L_CSTD
00010160 9F             03    FB  1BD5                  CALLS   #3, a#DS$SETVEC
              00000000'EF   94  1BDC  6398          CLRB    B_FLAGS                 ; initialize flags
              00000002'EF   94  1BE2  6399          CLRB    B_FLAGS3
                                1BE8  6400                                          ; clear buffers
58            00000000'FF   9E  1BE8  6401          MOVAB   aA_BUFFER_BEGIN,R8      ; load buffer starting address
59            00000400 8F   D0  1BEF  6402          MOVL    #1024,R9                ; do two pages
              00002134'EF   16  1BF6  6403          JSB     CLEAR_BUFFER            ; go clear buffers
                                1BFC  6404                                          ; send write command
54            FFE17B80 8F   D0  1BFC  6405          MOVL    #DELAY_TIME5,R4         ; load send packet delay time
55            00000086'EF   9E  1C03  6406          MOVAB   B_WRITE_3_CMD,R5        ; point to write command packet
                    57      0E  D0  1C0A  6407          MOVL    #14,R7                  ; load transfer byte count
              0000203D'EF   16  1C0D  6408          JSB     SEND_TU58               ; send command packet
24 00000000'EF              00  E1  1C13  6409          BBC     #V_CLOCK_FLAG,B_FLAGS,20$ ; br = no timeout error
                                1C1B  6410          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_INT_ERR,PRLINK=NO_READY
              00001BEB'EF   DF  1C1B                  PUSHAL  NO_READY
              000019D1'EF   DF  1C21                  PUSHAL  T_WR_INT_ERR
                      00    DD  1C27                  PUSHL   #0
                      01    DD  1C29                  PUSHL   #$ER
                                1C2B              ;;; TEST 10, SUBTEST 12, ERROR 1
000100D0 9F             04    FB  1C2B                  CALLS   #$$M, a#DS$ERRHARD
                                1C32  6411          $DS_BNCOMPLETE  10$
                   03   50    E9  1C32                  BLBC    R0, 10$
                                1C35  6412          $DS_ABORT       TEST
                      50    D4  1C35                  CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                            04  1C37                  RET                         ; TERMINATE TEST
```

```
                                1C38  6413 10$:    $DS_ABORT
00010020 9F   6C    FA          1C38                      CALLG   (AP), a#DS$ABORT
                                1C3F  6414                                          ; read continue
54   FFF3CB00 8F    D0          1C3F  6415 20$:    MOVL    #DELAY_TIME3,R4          ; load receive packet delay time
55   00000000'FF    9E          1C46  6416         MOVAB   a^A_BUFFER_BEGIN,R5      ; load buffer address to store data
     57   55   01    C1          1C4D  6417         ADDL3   #1,R5,R7                 ; load last expected address of data
      00002083'EF    16          1C51  6418         JSB     RECEIVE_TU58             ; go get data from TU58
5A   00000023'EF    9E          1C57  6419         MOVAB   B_CONTINUE,R10           ; load address of expected data
5B   00000000'FF    9E          1C5E  6420         MOVAB   a^A_BUFFER_BEGIN,R11     ; load address of actual data
          57   55    D1          1C65  6421         CMPL    R5,R7                    ; check for correct number of bytes
               2A    13          1C68  6422         BEQL    60$                      ; br = correct number of bytes
                                1C6A  6423 25$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_INT_ERR,PRLINK=REC_ERR,-
                                1C6A  6424                         P1=#T_REC_CONT
      00001D47'8F    DD          1C6A                      PUSHL   #T_REC_CONT
      00001EB4'EF    DF          1C70                      PUSHAL  REC_ERR
      000019D1'EF    DF          1C76                      PUSHAL  T_WR_INT_ERR
                00    DD          1C7C                      PUSHL   #0
                02    DD          1C7E                      PUSHL   #$ER
                                1C80       ;;; TEST 10, SUBTEST 12, ERROR 2
000100D0 9F   05    FB          1C80                      CALLS   #$$M, a#DS$ERRHARD
                                1C87  6425         $DS_BNCOMPLETE  30$
            03 50   E9          1C87                      BLBC    R0, 30$
                                1C8A  6426         $DS_ABORT       TEST
                50    D4          1C8A                      CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                04    1C8C                      RET                              ; TERMINATE TEST
                                1C8D  6427
                                1C8D  6428 30$:    $DS_ABORT
00010020 9F   6C    FA          1C8D                      CALLG   (AP), a#DS$ABORT
                                1C94  6429                                          ; check continue
          5C    01    D0          1C94  6430 60$:    MOVL    #1,R12                   ; load number of bytes to check
                                1C97  6431         $DS_BREAK
00010058 9F   6E    FA          1C97                      CALLG   (SP), a#DS$BREAK
     0000213B'EF    16          1C9E  6432         JSB     CHECK_PACKET             ; go check continue
                                1CA4  6433         $DS_BNCOMPLETE  80$               ; br = no error
            24 50   E9          1CA4                      BLBC    R0, 80$
                                1CA7  6434         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_INT_ERR,PRLINK=DATA_ERR_CONT
      00001E4D'EF    DF          1CA7                      PUSHAL  DATA_ERR_CONT
      000019D1'EF    DF          1CAD                      PUSHAL  T_WR_INT_ERR
                00    DD          1CB3                      PUSHL   #0
                03    DD          1CB5                      PUSHL   #$ER
                                1CB7       ;;; TEST 10, SUBTEST 12, ERROR 3
000100D0 9F   04    FB          1CB7                      CALLS   #$$M, a#DS$ERRHARD
                                1CBE  6435         $DS_BNCOMPLETE  70$
            03 50   E9          1CBE                      BLBC    R0, 70$
                                1CC1  6436         $DS_ABORT       TEST
                50    D4          1CC1                      CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                04    1CC3                      RET                              ; TERMINATE TEST
                                1CC4  6437 70$:    $DS_ABORT
00010020 9F   6C    FA          1CC4                      CALLG   (AP), a#DS$ABORT
                                1CCB  6438                                          ; send data packet
      00000000'EF    94          1CCB  6439 80$:    CLRB    B_FLAGS                  ; clear byte flags
      00000001'EF    94          1CD1  6440         CLRB    B_FLAGS2                 ; clear byte flags
      00000002'EF    94          1CD7  6441         CLRB    B_FLAGS3                 ; clear byte flags
55   0000070A'EF    9E          1CDD  6442         MOVAB   B_DATA_PKT_2,R5          ; point to data packet
57   55   00000084 8F    C1    1CE4  6443         ADDL3   #132,R5,R7               ; load pointer to end of data
```

```
                19   FF7E4CE0 8F    DA  1CEC  6444          MTPR    #DELAY_TIME7,#PR750$_NICR       ; load interval register 5.2
                00000000'8F   10    DA  1CF3  6445          MTPR    #M_TRANSFER,#PR$_ICCS   ; transfer time to ICS
                        19    01    DA  1CFA  6446          MTPR    #1,#PR750$_NICR         ; load very long next interval   5.2
     00000000'8F   80000041 8F    DA  1CFD  6447          MTPR    #<M_ERROR+M_ENABLE+M_RUN>,#PR$_ICCS ; start timer
                1E   00000040 8F    DA  1D08  6448          MTPR    #M_ENABLE,#PR750$_CSTS  ; enable send interrupt          5.2
                                     1D0F  6449
                                     1D0F  6450 85$:     $DS_BREAK
                00010058 9F   6E    FA  1D0F                        CALLG   (SP), a#DS$BREAK
             08 00000002'EF   01    E0  1D16  6451          BBS     #V_SDONE_FLAG,B_FLAGS3,87$ ; br = finished sending
             E9 00000000'EF   00    E1  1D1E  6452          BBC     #V_CLOCK_FLAG,B_FLAGS,85$ ; br = no timeout
                        1E   00    DA  1D26  6453 87$:     MTPR    #0,#PR750$_CSTS         ; disable send interrupt         5.2
                        57   55    D1  1D29  6454          CMPL    R5,R7                   ; check number of bytes sent
                             24    13  1D2C  6455          BEQL    100$                    ; br = correct number of bytes sent
                                     1D2E  6456          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_INT_ERR,PRLINK=SEND_INT_ERR
                        00001AC9'EF   DF  1D2E                      PUSHAL  SEND_INT_ERR
                        000019D1'EF   DF  1D34                      PUSHAL  T_WR_INT_ERR
                                 00   DD  1D3A                      PUSHL   #0
                                 04   DD  1D3C                      PUSHL   #$ER
                                     1D3E      ;;; TEST 10, SUBTEST 12, ERROR 4
                000100D0 9F      04  FB  1D3E                      CALLS   #$$M, a#DS$ERRHARD
                                     1D45  6457          $DS_BNCOMPLETE  90$
                           03 50     E9  1D45                      BLBC    R0, 90$
                                     1D48  6458          $DS_ABORT       TEST
                                 50   D4  1D48                      CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                                 04   1D4A                      RET                             ; TERMINATE TEST
                                     1D4B  6459 90$:     $DS_ABORT
                00010020 9F      6C  FA  1D4B                      CALLG   (AP), a#DS$ABORT
                                     1D52  6460                                              ; read end packet
                     00000002'EF   96  1D52  6461 100$:   INCB    B_FLAGS3                    ; set data done flag
                54   FF7E4CE0 8F   D0  1D58  6462         MOVL    #DELAY_TIME7,R4             ; load receive packet delay time
                55   00000000'FF   9E  1D5F  6463         MOVAB   @A_BUFFER_BEGIN,R5          ; load address to store actual data
                   57    55    0E    C1  1D66  6464         ADDL3   #14,R5,R7               ; load last expected address of data
                     00002083'EF   16  1D6A  6465         JSB     RECEIVE_TU58            ; go get data from TU58
                5A   0000060C'EF   9E  1D70  6466         MOVAB   B_END_PACKET_S,R10      ; load address of expected end packet
                5B   00000000'FF   9E  1D77  6467         MOVAB   @A_BUFFER_BEGIN,R11     ; load address of actual end packet
                        57    55    D1  1D7E  6468         CMPL    R5,R7                   ; check for correct number of bytes
                              31    13  1D81  6469         BEQL    140$                    ; br = correct number of bytes
                00000000'EF      08  88  1D83  6470         BISB2   #M_END_FLAG,B_FLAGS     ; set end error flag
                                     1D8A  6471 105$:     $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_INT_ERR,PRLINK=REC_ERR,-
                                     1D8A  6472                             P1=#T_REC_END
                     00001D2E'8F   DD  1D8A                      PUSHL   #T_REC_END
                     00001EB4'EF   DF  1D90                      PUSHAL  REC_ERR
                     000019D1'EF   DF  1D96                      PUSHAL  T_WR_INT_ERR
                                 00   DD  1D9C                      PUSHL   #0
                                 05   DD  1D9E                      PUSHL   #$ER
                                     1DA0      ;;; TEST 10, SUBTEST 12, ERROR 5
                000100D0 9F      05  FB  1DA0                      CALLS   #$$M, a#DS$ERRHARD
                                     1DA7  6473          $DS_BNCOMPLETE  110$
                           03 50     E9  1DA7                      BLBC    R0, 110$
                                     1DAA  6474          $DS_ABORT       TEST
                                 50   D4  1DAA                      CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                                 04   1DAC                      RET                             ; TERMINATE TEST
                                     1DAD  6475
                                     1DAD  6476 110$:     $DS_ABORT
                00010020 9F      6C  FA  1DAD                      CALLG   (AP), a#DS$ABORT
```

```
                                1DB4  6477                                          ; check end packet
                5C   0E   D0    1DB4  6478 140$:   MOVL    #14,R12                 ; load number of bytes to check
                                1DB7  6479         $DS_BREAK
        00010058 9F   6E   FA   1DB7                       CALLG   (SP), a#DS$BREAK
             0000213B'EF   16   1DBE  6480         JSB     CHECK_PACKET            ; go check end packet
                                1DC4  6481         $DS_BNCOMPLETE  160$            ; br = no error
                   24 50   E9   1DC4                       BLBC    R0, 160$
                                1DC7  6482         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_INT_ERR,PRLINK=DATA_ERR_END
             00001E9D'EF   DF   1DC7                       PUSHAL  DATA_ERR_END
             000019D1'EF   DF   1DCD                       PUSHAL  T_WR_INT_ERR
                      00   DD   1DD3                       PUSHL   #0
                      06   DD   1DD5                       PUSHL   #$ER
                                1DD7       ;;; TEST 10, SUBTEST 12, ERROR 6
        000100D0 9F   04   FB   1DD7                       CALLS   #$$M, a#DS$ERRHARD
                                1DDE  6483         $DS_BNCOMPLETE  150$
                   03 50   E9   1DDE                       BLBC    R0, 150$
                                1DE1  6484         $DS_ABORT       TEST
                      50   D4   1DE1                       CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                           04   1DE3                       RET                     ; TERMINATE TEST
                                1DE4  6485 150$:   $DS_ABORT
        00010020 9F   6C   FA   1DE4                       CALLG   (AP), a#DS$ABORT
                                1DEB  6486 160$:
                                1DEB  6487         $DS_ENDSUB
                                1DEB       T10_S12_X:
  00010038 9F   000000A8'EF   FA   1DEB                       CALLG   $S$, a#DS$ENDSUB
                                1DF6  6488         $DS_PAGE
```

```
1DF6                    .SBTTL  SUBTEST 10.13:  READ RECORD INTERRUPT
1DF6  6491 ;*
1DF6  6492 ; SUBTEST DESCRIPTION:
1DF6  6493 ;
1DF6  6494 ;       This subtest sends the TU58 a command packet to read the last 128
1DF6  6495 ;       bytes of data that were written in the previous subtest in the inter-
1DF6  6496 ;       rupt-driven mode. A timer is set which should allow sufficient time
1DF6  6497 ;       to read a complete record and end packet. An error is reported if
1DF6  6498 ;       this does not occur within the allotted time. The end packet and data
1DF6  6499 ;       packet are checked for errors. If any errors are encountered they are
1DF6  6500 ;       reported.
1DF6  6501 ;
1DF6  6502 ;
1DF6  6503 ; SUBTEST STEPS:
1DF6  6504 ;
1DF6  6505 ;       SUBTEST READ RECORD INTERRUPT
1DF6  6506 ;       : Clear buffer
1DF6  6507 ;       : Point to read command packet
1DF6  6508 ;       : REPEAT
1DF6  6509 ;       : : Send command packet byte at a time
1DF6  6510 ;       : : Set timer
1DF6  6511 ;       : : IF timer expired and no response
1DF6  6512 ;       : : : THEN
1DF6  6513 ;       : : : Report no response error
1DF6  6514 ;       : : : Exit test
1DF6  6515 ;       : : ENDIF
1DF6  6516 ;       : : UNTIL all bytes sent
1DF6  6517 ;       : ENDREPEAT
1DF6  6518 ;       : ENABLE read interrupt
1DF6  6519 ;       : SET timer
1DF6  6520 ;       : REPEAT
1DF6  6521 ;       : : IF interrupt occurs
1DF6  6522 ;       : : : THEN
1DF6  6523 ;       : : : : Read byte
1DF6  6524 ;       : : ENDIF
1DF6  6525 ;       : : UNTIL timer expired
1DF6  6526 ;       : ENDREPEAT
1DF6  6527 ;       : IF expected byte count NEQ actual byte count
1DF6  6528 ;       : : THEN
1DF6  6529 ;       : : : DISABLE read interrupt
1DF6  6530 ;       : : : Report error
1DF6  6531 ;       : : : Exit test
1DF6  6532 ;       : ENDIF
1DF6  6533 ;       : DISABLE read interrupt
1DF6  6534 ;       : Point to expected data packet
1DF6  6535 ;       : REPEAT
1DF6  6536 ;       : : IF data expected NEQ data received
1DF6  6537 ;       : : : THEN
1DF6  6538 ;       : : : Report data error
1DF6  6539 ;       : : : Exit subtest
1DF6  6540 ;       : : ENDIF
1DF6  6541 ;       : : Point to next byte of data
1DF6  6542 ;       : : UNTIL all data in packet checked
1DF6  6543 ;       : ENDREPEAT
1DF6  6544 ;       : Point to expected end packet
```

```
                                1DF6  6545 ;       :  REPEAT
                                1DF6  6546 ;       :  :  IF expected end packet data NEQ received end packet data
                                1DF6  6547 ;       :  :  :  THEN
                                1DF6  6548 ;       :  :  :  Report end packet data error
                                1DF6  6549 ;       :  :  :  Exit subtest
                                1DF6  6550 ;       :  :  ENDIF
                                1DF6  6551 ;       :  : UNTIL all end packet bytes checked
                                1DF6  6552 ;       :  ENDREPEAT
                                1DF6  6553 ;       ENDSUBTEST READ RECORD INTERRUPT
                                1DF6  6554 ;
                                1DF6  6555 ;
                                1DF6  6556 ;
                                1DF6  6557 ;.page
                                1DF6  6558 ;-
                                1DF6  6559         $DS_BGNSUB
                                1DF6       T10_S13::
00010030 9F   000000B4'EF   FA  1DF6                CALLG   $S$, a#DS$BGNSUB
                                1E01  6560         $DS_SETVEC_S    VECTOR=#SCB$L_CSRD,SRVADR=READ_SERVICE
                      00    DD  1E01                PUSHL   #0
              00002164'EF   DF  1E03                PUSHAL  READ_SERVICE
              000000F0 8F   DD  1E09                PUSHL   #SCB$L_CSRD
          00010160 9F   03  FB  1E0F                CALLS   #3, a#DS$SETVEC
              00000000'EF   94  1E16  6561          CLRB    B_FLAGS                 ; clear byte flags
              00000001'EF   94  1E1C  6562          CLRB    B_FLAGS2                ; clear byte flags
          58  00000000'FF   9E  1E22  6563          MOVAB   @A_BUFFER_BEGIN,R8      ; load buffer start address
          59  00000400 8F   D0  1E29  6564          MOVL    #1024,R9                ; load number of bytes to clear
              00002134'EF   16  1E30  6565          JSB     CLEAR_BUFFER            ; go clear buffer
                    56   1D  DB  1E36  6566          MFPR    #PR750$_CSRD,R6         ; dump data buffer to clear done   5.2
          1C  00000040 8F   DA  1E39  6567          MTPR    #M_ENABLE,#PR750$_CSRS  ; enable read interrupt            5.2
          53  00000000'FF   9E  1E40  6568          MOVAB   @A_BUFFER_BEGIN,R3      ; load buffer address
      59  00000092 8F   53  C1  1E47  6569          ADDL3   R3,#146,R9              ; load expected end of buffer
          55  00000094'EF   9E  1E4F  6570          MOVAB   B_READ_3_CMD,R5         ; point to read record command packet
                    57   0E  D0  1E56  6571          MOVL    #14,R7                  ; load byte count
              0000203D'EF   16  1E59  6572          JSB     SEND_TU58               ; send command packet
        24 00000000'EF   00  E1  1E5F  6573          BBC     #V_CLOCK_FLAG,B_FLAGS,20$ ; br = no timeout error
                                1E67  6574          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_INT_ERR,PRLINK=NO_READY
              00001BEB'EF   DF  1E67                PUSHAL  NO_READY
              0000199F'EF   DF  1E6D                PUSHAL  T_RD_INT_ERR
                    00   DD  1E73                PUSHL   #0
                    01   DD  1E75                PUSHL   #$ER
                                1E77            ;;; TEST 10, SUBTEST 13, ERROR 1
          000100D0 9F   04  FB  1E77                CALLS   #$$M, a#DS$ERRHARD
                                1E7E  6575          $DS_BNCOMPLETE  10$
                 03 50  E9  1E7E                BLBC    R0, 10$
                                1E81  6576          $DS_ABORT       TEST
                    50   D4  1E81                CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                    04   1E83                RET                             ; TERMINATE TEST
                                1E84  6577 10$:     $DS_ABORT
          00010020 9F   6C  FA  1E84                CALLG   (AP), a#DS$ABORT
              00000000'EF   94  1E8B  6578 20$:     CLRB    B_FLAGS                 ; clear byte flags
          19  FF7E4CE0 8F   DA  1E91  6579          MTPR    #DELAY_TIME7,#PR750$_NICR       ; load timer interval   5.2
          00000000'8F   10  DA  1E98  6580          MTPR    #M_TRANSFER,#PR$_ICCS   ; transfer time to ICS
                    19   01  DA  1E9F  6581          MTPR    #1,#PR750$_NICR         ; load very long next interval  5.2
00000000'8F   80000041 8F   DA  1EA2  6582          MTPR    #<M_ERROR+M_ENABLE+M_RUN>,#PR$_ICCS ; start timer
                                1EAD  6583 30$:     $DS_BREAK
```

```
                00010058 9F    6E    FA  1EAD                        CALLG   (SP), a#DS$BREAK
             F1 00000000'EF    00    E1  1EB4  6584                  BBC     #V_CLOCK_FLAG,B_FLAGS,30$ ; br = no timeout
                       1C      00    DA  1EBC  6585                  MTPR    #0,#PR750$_CSRS           ; disable read interrupt       5.2
                5B   00000000'FF    9E  1EBF  6586                  MOVAB   aA_BUFFER_BEGIN,R11       ; load address of actual data
                5A   0000070A'EF    9E  1EC6  6587                  MOVAB   B_DATA_PKT_2,R10          ; load address of expected data
                           59   53   D1  1ECD  6588                  CMPL    R3,R9                     ; correct number of bytes received ?
                                34   13  1ED0  6589                  BEQL    50$                       ; br = correct number of bytes received
                00000000'EF    04    88  1ED2  6590                  BISB2   #M_DATA_FLAG,B_FLAGS      ; set data error flag
                           55   53   D0  1ED9  6591                  MOVL    R3,R5                     ; point to last address loaded
                                     1EDC  6592                  $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_INT_ERR,PRLINK=REC_ERR,-
                                     1EDC  6593                                  P1=#T_REC_DATA
                     00001D68'8F    DD  1EDC                        PUSHL   #T_REC_DATA
                     00001EB4'EF    DF  1EE2                        PUSHAL  REC_ERR
                     0000199F'EF    DF  1EE8                        PUSHAL  T_RD_INT_ERR
                                00  DD  1EEE                        PUSHL   #0
                                02  DD  1EF0                        PUSHL   #$ER
                                     1EF2        ::: TEST 10, SUBTEST 13, ERROR 2
                000100D0 9F    05    FB  1EF2                        CALLS   #$$M, a#DS$ERRHARD
                                     1EF9  6594                  $DS_BNCOMPLETE  40$
                           03   50   E9  1EF9                        BLBC    R0, 40$
                                     1EFC  6595                  $DS_ABORT       TEST
                                50   D4  1EFC                        CLRL    R0                        ; SEND A WARNING TO THE SUPERVISOR
                                04   1EFE                        RET                               ; TERMINATE TEST
                                     1EFF  6596 40$:             $DS_ABORT
                00010020 9F    6C    FA  1EFF                        CALLG   (AP), a#DS$ABORT
                5C   00000084 8F    D0  1F06  6597 50$:             MOVL    #132,R12                  ; load number of bytes to check
                                     1F0D  6598                  $DS_BREAK
                00010058 9F    6E    FA  1F0D                        CALLG   (SP), a#DS$BREAK
                     0000213B'EF    16  1F14  6599                  JSB     CHECK_PACKET              ; go check data packet
                                     1F1A  6600                  $DS_BNCOMPLETE  70$               ; br = no data error
                           24   50   E9  1F1A                        BLBC    R0, 70$
                                     1F1D  6601                  $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_INT_ERR,PRLINK=DATA_ERR_DATA
                     00001E75'EF    DF  1F1D                        PUSHAL  DATA_ERR_DATA
                     0000199F'EF    DF  1F23                        PUSHAL  T_RD_INT_ERR
                                00  DD  1F29                        PUSHL   #0
                                03  DD  1F2B                        PUSHL   #$ER
                                     1F2D        ::: TEST 10, SUBTEST 13, ERROR 3
                000100D0 9F    04    FB  1F2D                        CALLS   #$$M, a#DS$ERRHARD
                                     1F34  6602                  $DS_BNCOMPLETE  60$
                           03   50   E9  1F34                        BLBC    R0, 60$
                                     1F37  6603                  $DS_ABORT       TEST
                                50   D4  1F37                        CLRL    R0                        ; SEND A WARNING TO THE SUPERVISOR
                                04   1F39                        RET                               ; TERMINATE TEST
                                     1F3A  6604 60$:             $DS_ABORT
                00010020 9F    6C    FA  1F3A                        CALLG   (AP), a#DS$ABORT
                5A   0000060C'EF    9E  1F41  6605 70$:             MOVAB   B_END_PACKET_S,R10        ; load address of expected end packet
                5B   00000084 8F    C0  1F48  6606                  ADDL2   #132,R11                  ; adjust pointer to actual end packet
                           5C   0E   D0  1F4F  6607                  MOVL    #14,R12                   ; load number of bytes to check
                                     1F52  6608                  $DS_BREAK
                00010058 9F    6E    FA  1F52                        CALLG   (SP), a#DS$BREAK
                     0000213B'EF    16  1F59  6609                  JSB     CHECK_PACKET              ; go check end packet
                                     1F5F  6610                  $DS_BNCOMPLETE  90$               ; br = no data error
                           24   50   E9  1F5F                        BLBC    R0, 90$
                                     1F62  6611                  $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_INT_ERR,PRLINK=DATA_ERR_END
                     00001E9D'EF    DF  1F62                        PUSHAL  DATA_ERR_END
```

```
                0000199F'EF   DF  1F68                          PUSHAL  T_RD_INT_ERR
                          00  DD  1F6E                          PUSHL   #0
                          04  DD  1F70                          PUSHL   #$ER
                              1F72        ;;; TEST 10, SUBTEST 13, ERROR 4
            000100D0 9F   04  FB  1F72                          CALLS   #$$M, a#DS$ERRHARD
                              1F79  6612        $DS_BNCOMPLETE  80$
                       03 50  E9  1F79                          BLBC    R0, 80$
                              1F7C  6613        $DS_ABORT       TEST
                          50  D4  1F7C                          CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                          04  1F7E                              RET                     ; TERMINATE TEST
                              1F7F  6614 80$:   $DS_ABORT
            00010020 9F   6C  FA  1F7F                          CALLG   (AP), a#DS$ABORT
                              1F86  6615 90$:
                              1F86  6616        $DS_ENDSUB
                              1F86        T10_S13_X:
    00010038 9F   000000B4'EF  FA  1F86                         CALLG   $S$, a#DS$ENDSUB
                              1F91  6617        $DS_PAGE
```

```
1F91                    .SBTTL  SUBTEST 10.14:  IPL CHECK
1F91   6620 ;*
1F91   6621 ; SUBTEST DESCRIPTION:
1F91   6622 ;
1F91   6623 ;       This subtest checks that the TU58 interrupt occurs at the cor-
1F91   6624 ;       rect interrupt priority level.  The IPL is set one level above
1F91   6625 ;       that at which a TU58 interrupt should occur.  A NOP command is
1F91   6626 ;       issued to cause the return  of an end packet in interrupt mode.
1F91   6627 ;       If an interrupt occurs an error is reported.  The IPL is then
1F91   6628 ;       decremented and if an interrupt does not occur within a reason-
1F91   6629 ;       interval an error is reported.  There are no data checks made.
1F91   6630 ;
1F91   6631 ;
1F91   6632 ; SUBTEST STEPS:
1F91   6633 ;
1F91   6634 ;       SUBTEST IPL CHECK
1F91   6635 ;       :  Point to NOP command packet
1F91   6636 ;       :  REPEAT
1F91   6637 ;       :  :  SEND command packet byte at a time
1F91   6638 ;       :  :  SET timer
1F91   6639 ;       :  :  IF timer expired AND no response
1F91   6640 ;       :  :  :  THEN
1F91   6641 ;       :  :  :  :  REPORT no response error
1F91   6642 ;       :  :  :  :  Exit test
1F91   6643 ;       :  :  ENDIF
1F91   6644 ;       :  : UNTIL all bytes sent
1F91   6645 ;       :  ENDREPEAT
1F91   6646 ;       :  SET IPL above read interrupt
1F91   6647 ;       :  SET timer
1F91   6648 ;       :  ENABLE read interrupt
1F91   6649 ;       :  IF interrupt occurs before timeout
1F91   6650 ;       :  :  THEN
1F91   6651 ;       :  :  :  DISABLE read interrupt
1F91   6652 ;       :  :  :  REPORT error
1F91   6653 ;       :  :  :  Abort test
1F91   6654 ;       :  :  ENDIF
1F91   6655 ;       :  DISABLE read interrupt
1F91   6656 ;       :  DECR IPL
1F91   6657 ;       :  SET timer
1F91   6658 ;       :  ENABLE read interrupt
1F91   6659 ;       :  IF timer expires AND no interrupt
1F91   6660 ;       :  :  THEN
1F91   6661 ;       :  :  :  DISABLE read interrupt
1F91   6662 ;       :  :  :  REPORT error
1F91   6663 ;       :  :  :  Abort test
1F91   6664 ;       :  ENDIF
1F91   6665 ;       :  DISABLE read interrupt
1F91   6666 ;       :  CLEAR IPL
1F91   6667 ;       ENDSUBTEST IPL CHECK
1F91   6668 ;
1F91   6669 ;
1F91   6670 ;
1F91   6671 ;.page
1F91   6672 ;-
1F91   6673
```

```
                                1F91  6674          $DS_BGNSUB
                                1F91        T10_S14::
    00010030 9F   000000C0'EF    FA  1F91                CALLG   $S$, a#DS$BGNSUB
                                1F9C  6675          $DS_CLRVEC_S    VECTOR=#SCB$L_CSRD
             000000F0 8F         DD  1F9C                PUSHL   #SCB$L_CSRD
          00010168 9F   01       FB  1FA2                CALLS   #1, a#DS$CLRVEC
                                1FA9  6676          $DS_SETVEC_S    VECTOR=#SCB$L_CSRD,SRVADR=READ_SERVICE2
                   00           DD  1FA9                PUSHL   #0
             000021A0'EF        DF  1FAB                PUSHAL  READ_SERVICE2
             000000F0 8F        DD  1FB1                PUSHL   #SCB$L_CSRD
          00010160 9F   03       FB  1FB7                CALLS   #3, a#DS$SETVEC
             00000000'EF        94  1FBE  6677          CLRB    B_FLAGS                 ; clear byte flags
             00000001'EF        94  1FC4  6678          CLRB    B_FLAGS2                ; clear byte flags
             00000002'EF        94  1FCA  6679          CLRB    B_FLAGS3                ; clear byte flags
          54 FFFB6C20 8F        D0  1FD0  6680          MOVL    #DELAY_TIME1,R4         ; load send packet delay time
          55 00000032'EF        9E  1FD7  6681          MOVAB   B_NOP_CMD,R5            ; point to init command packet
                57              0E  1FDE  6682          MOVL    #14,R7                  ; load transfer byte count
             0000203D'EF        16  1FE1  6683          JSB     SEND_TU58               ; send command packet
       24 00000000'EF           00  E1  1FE7  6684          BBC     #V_CLOCK_FLAG,B_FLAGS,20$ ; br = no timeout error
                                1FEF  6685          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_IPL_ERR,PRLINK=NO_READY
             00001BEB'EF        DF  1FEF                PUSHAL  NO_READY
             00001A04'EF        DF  1FF5                PUSHAL  T_IPL_ERR
                   00           DD  1FFB                PUSHL   #0
                   01           DD  1FFD                PUSHL   #$ER
                                1FFF        ;;; TEST 10, SUBTEST 14, ERROR 1
          000100D0 9F   04       FB  1FFF                CALLS   #$$M, a#DS$ERRHARD
                                2006  6686          $DS_BNCOMPLETE  10$
                03 50           E9  2006                BLBC    R0, 10$
                                2009  6687          $DS_ABORT       TEST
                   50           D4  2009                CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                                04  200B                RET                             ; TERMINATE TEST
                                200C  6688 10$:     $DS_ABORT
          00010020 9F   6C       FA  200C                CALLG   (AP), a#DS$ABORT
                                2013  6689
             00000000'EF        94  2013  6690 20$:     CLRB    B_FLAGS                 ; clear byte flags
                56              1D  DB  2019  6691          MFPR    #PR750$_CSRD,R6         ; dump buffer to clear done     5.2
                                201C  6692          $DS_SETIPL_S    LEVEL=#^X17     ; set IPL above read interrupt
                   17           DD  201C                PUSHL   #^X17
          00010178 9F   01       FB  201E                CALLS   #1, a#DS$SETIPL
          19   FFF3CB00 8F       DA  2025  6693          MTPR    #DELAY_TIME3,#PR750$_NICR       ; load timer interval   5.2
          00000000'8F   10       DA  202C  6694          MTPR    #M_TRANSFER,#PR$_ICCS   ; transfer time to ICS
                   19   01       DA  2033  6695          MTPR    #1,#PR750$_NICR         ; load very long next interval  5.2
    00000000'8F   80000041 8F     DA  2036  6696          MTPR    #<M_ERROR+M_ENABLE+M_RUN>,#PR$_ICCS ; start timer
          1C   00000040 8F        DA  2041  6697          MTPR    #M_ENABLE,#PR750$_CSRS  ; enable read interrupt         5.2
                                2048  6698 30$:     $DS_BREAK                       ; enable break
          00010058 9F   6E       FA  2048                CALLG   (SP), a#DS$BREAK
       F1 00000000'EF           00  E1  204F  6699          BBC     #V_CLOCK_FLAG,B_FLAGS,30$ ; br = no timeout
       27 00000002'EF           02  E1  2057  6700          BBC     #V_RD_INT_FLAG,B_FLAGS3,50$ ; br = no interrupt
                1C              00  DA  205F  6701          MTPR    #0,#PR750$_CSRS         ; disable read interrupt        5.2
                                2062  6702          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_IPL_ERR,PRLINK=INT_ERR
             00001F3D'EF        DF  2062                PUSHAL  INT_ERR
             00001A04'EF        DF  2068                PUSHAL  T_IPL_ERR
                   00           DD  206E                PUSHL   #0
                   02           DD  2070                PUSHL   #$ER
                                2072        ;;; TEST 10, SUBTEST 14, ERROR 2
```

```
                000100D0 9F   04    FB  2072                        CALLS   #$$M, a#DS$ERRHARD
                                    2079  6703          $DS_BNCOMPLETE  40$
                      03 50   E9    2079                        BLBC    R0, 40$
                                    207C  6704          $DS_ABORT       TEST
                         50   D4    207C                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                              04    207E                        RET                         ; TERMINATE TEST
                                    207F  6705 40$:     $DS_ABORT
                00010020 9F   6C    FA  207F                        CALLG   (AP), a#DS$ABORT
                                    2086  6706
                      1C   00    DA  2086  6707 50$:     MTPR    #0,#PR750$_CSRS             ; disable read interrupt        5.2
                   00000002'EF   94    2089  6708          CLRB    B_FLAGS3                    ; clear byte flags
                19 FF7E4CE0 8F    DA  208F  6709          MTPR    #DELAY_TIME7,#PR750$_NICR       ; load timer interval   5.2
                00000000'8F   10    DA  2096  6710          MTPR    #M_TRANSFER,#PR$_ICCS       ; transfer time to ICS
                      19   01    DA  209D  6711          MTPR    #1,#PR750$_NICR             ; load very long next interval  5.2
          00000000'8F   80000041 8F    DA  20A0  6712          MTPR    #<M_ERROR+M_ENABLE+M_RUN>,#PR$_ICCS ; start timer
                1C   00000040 8F    DA  20AB  6713          MTPR    #M_ENABLE,#PR750$_CSRS      ; enable read interrupt         5.2
                                    20B2  6714          $DS_SETIPL_S    LEVEL=#^X16         ; set IPL to allow read interrupt
                         16   DD    20B2                        PUSHL   #^X16
                00010178 9F   01    FB  20B4                        CALLS   #1, a#DS$SETIPL
                                    20BB  6715 60$:     $DS_BREAK                           ; enable break
                00010058 9F   6E    FA  20BB                        CALLG   (SP), a#DS$BREAK
              2F 00000002'EF   02    E0  20C2  6716          BBS     #V_RD_INT_FLAG,B_FLAGS3,80$ ; br = interrupt
              E9 00000000'EF   00    E1  20CA  6717          BBC     #V_CLOCK_FLAG,B_FLAGS,60$ ; br = no timeout
                      1C   00    DA  20D2  6718          MTPR    #0,#PR750$_CSRS             ; disable read interrupt        5.2
                                    20D5  6719          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_IPL_ERR,PRLINK=NO_INT_ERR
                   00001F4B'EF   DF    20D5                        PUSHAL  NO_INT_ERR
                   00001A04'EF   DF    20DB                        PUSHAL  T_IPL_ERR
                         00   DD    20E1                        PUSHL   #0
                         03   DD    20E3                        PUSHL   #$ER
                                    20E5        ;;; TEST 10, SUBTEST 14, ERROR 3
                000100D0 9F   04    FB  20E5                        CALLS   #$$M, a#DS$ERRHARD
                                    20EC  6720          $DS_BNCOMPLETE  70$
                      03 50   E9    20EC                        BLBC    R0, 70$
                                    20EF  6721          $DS_ABORT       TEST
                         50   D4    20EF                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                              04    20F1                        RET                         ; TERMINATE TEST
                                    20F2  6722 70$:     $DS_ABORT
                00010020 9F   6C    FA  20F2                        CALLG   (AP), a#DS$ABORT
                                    20F9  6723
                      1C   00    DA  20F9  6724 80$:     MTPR    #0,#PR750$_CSRS             ; disable interrupt             5.2
                                    20FC  6725          $DS_SETIPL_S    LEVEL=#0            ; restore IPL
                         00   DD    20FC                        PUSHL   #0
                00010178 9F   01    FB  20FE                        CALLS   #1, a#DS$SETIPL
                                    2105  6726
                                    2105  6727          $DS_ENDSUB
                                    2105        T10_S14_X:
00010038 9F   000000C0'EF   FA    2105                        CALLG   $S$, a#DS$ENDSUB
                                    2110  6728
                                    2110  6729          $DS_CLRVEC_S    VECTOR=#SCB$L_TIMER
                   000000C0 8F    DD  2110                        PUSHL   #SCB$L_TIMER
                00010168 9F   01    FB  2116                        CALLS   #1, a#DS$CLRVEC
                                    211D  6730          $DS_CLRVEC_S    VECTOR=#SCB$L_CSRD
                   000000F0 8F    DD  211D                        PUSHL   #SCB$L_CSRD
                00010168 9F   01    FB  2123                        CALLS   #1, a#DS$CLRVEC
                                    212A  6731          $DS_CLRVEC_S    VECTOR=#SCB$L_CSTD
```

```
                000000F4 8F    DD  212A                        PUSHL   #SCB$L_CSTD
            00010168 9F    01  FB  2130                        CALLS   #1, a#DS$CLRVEC
                                   2137  6732
                                   2137  6733          $DS_ENDTEST
                       50  01  D0  2137                        MOVL    #1, R0          ; NORMAL EXIT
                                   213A          TEST_010_X::
            00010058 9F    6E  FA  213A                        CALLG   (SP), a#DS$BREAK
                                04 2141                        RET                     ; RETURN TO TEST SEQUENCER
                                   2142  6734
                                   2142  6735          $DS_PAGE
```

```
                        2142  6737
                        2142                  .SBTTL  TEST 11:  TU58 EXERCISER (WITH MRSP)
                     00000000                         .PSECT  TEST_011, PAGE, NOWRT
                        0020
                        0020  6739 ;++
                        0020  6740 ; Test description:
                        0020  6741 ;
                        0020  6742 ;       This test exercises the TU58 on the VAX-11/750 by performing
                        0020  6743 ;       initialization, self diagnostic and no operation.
                        0020  6744 ;       All information received from the TU58 is checked for errors.
                        0020  6745 ;       All errors detected are reported.
                        0020  6746 ;
                        0020  6747 ;
                        0020  6748 ; Assumptions:
                        0020  6749 ;
                        0020  6750 ;       This subtest does not write or read the TU58. All operations performed
                        0020  6751 ;       deal with the controller only. (NOTE: Test 2 requires a scratch tape).
                        0020  6752 ;
                        0020  6753 ;
                        0020  6754 ;.page
                        0020  6755 ;--
                        0020  6756
                        0020  6757            $DS_BGNTEST     <DEFAULT,TU58,ALL>
                        0020        DATA_011:
                00000000  0020                .LONG   0               ; TEST ARGUMENT TABLE TERMINATOR
                        0024        TEST_011::
                    0000  0024                .WORD   ^M<>            ; ENTRY MASK
                        0026  6758
                        0026  6759
                        0026  6760            ; Set Up
                        0026  6761
                        0026  6762
                        0026  6763            $DS_SETVEC_S    VECTOR=#SCB$L_TIMER,SRVADR=TIMER_SERVICE
                              00    DD  0026          PUSHL   #0
                    00002150'EF     DF  0028          PUSHAL  TIMER_SERVICE
                    000000C0 8F     DD  002E          PUSHL   #SCB$L_TIMER
                00010160 9F   03    FB  0034          CALLS   #3, a#DS$SETVEC
                58  00000000'FF     9E  003B  6764 1$:      MOVAB   @A_BUFFER_BEGIN,R8      ; load buffer starting address
00000013'EF     58  00000092 8F     C1  0042  6765          ADDL3   #146,R8,BUF_LIM         ; construct upper buffer limit
                59  00000400 8F     D0  004E  6766          MOVL    #1024,R9                ; do both pages
                    00002134'EF     16  0055  6767          JSB     CLEAR_BUFFER            ; go clear buffers
                    00000000'EF     94  005B  6768          CLRB    B_FLAGS                 ; init flags
                    00000001'EF     94  0061  6769          CLRB    B_FLAGS2                ; init flags
                                        0067  6770
                    00001FCB'EF     16  0067  6771 2$:      JSB     MINIT_SEQUENCE          ; initialize drive
                5A  00000023'EF     9E  006D  6772          MOVAB   B_CONTINUE,R10          ; load expected data address
                5B  00000000'FF     9E  0074  6773          MOVAB   @A_BUFFER_BEGIN,R11     ; load actual data address
            2C 00000000'EF   04     E1  007B  6774          BBC     #V_SEND_FLAG,B_FLAGS,5$ ; br = no send error
            DC 00000001'EF   01     E3  0083  6775          BBCS    #V_REPEAT_SEND,B_FLAGS2,2$ ; br = first try and set flag
                                        008B  6776          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT1_ERR,PRLINK=NO_READY
                    00001BEB'EF     DF  008B                PUSHAL  NO_READY
                    0000183B'EF     DF  0091                PUSHAL  T_INIT1_ERR
                              00    DD  0097                PUSHL   #0
                              01    DD  0099                PUSHL   #$ER
                                        009B        ;;; TEST 11, SUBTEST 0, ERROR 1
```

```
                000100D0 9F    04    FB  009B                        CALLS   #$$M, a#DS$ERRHARD
                                         00A2  6777          $DS_BNCOMPLETE  3$
                      03 50    E9        00A2                        BLBC    R0, 3$
                                         00A5  6778          $DS_ABORT       TEST
                         50    D4        00A5                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                               04        00A7                        RET                         ; TERMINATE TEST
                                         00A8  6779 3$:      $DS_ABORT
                00010020 9F    6C    FA  00A8                        CALLG   (AP), a#DS$ABORT
                                         00AF  6780
             32 00000000'EF    01    E1  00AF  6781 5$:      BBC     #V_RECEIVE_FLAG,B_FLAGS,9$ ; br = no receive error
             A8 00000001'EF    01    E3  00B7  6782          BBCS    #V_REPEAT_SEND,B_FLAGS2,2$ ; br = first try and set flag
                                         00BF  6783 7$:      $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT1_ERR,PRLINK=REC_ERR,-
                                         00BF  6784                      P1=#T_REC_CONT
                      00001D47'8F      DD  00BF                        PUSHL   #T_REC_CONT
                      00001EB4'EF      DF  00C5                        PUSHAL  REC_ERR
                      0000183B'EF      DF  00CB                        PUSHAL  T_INIT1_ERR
                                  00   DD  00D1                        PUSHL   #0
                                  02   DD  00D3                        PUSHL   #$ER
                                         00D5      ;;; TEST 11, SUBTEST 0, ERROR 2
                000100D0 9F    05    FB  00D5                        CALLS   #$$M, a#DS$ERRHARD
                                         00DC  6785          $DS_BNCOMPLETE  8$
                      03 50    E9        00DC                        BLBC    R0, 8$
                                         00DF  6786          $DS_ABORT       TEST
                         50    D4        00DF                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                               04        00E1                        RET                         ; TERMINATE TEST
                                         00E2  6787 8$:      $DS_ABORT
                00010020 9F    6C    FA  00E2                        CALLG   (AP), a#DS$ABORT
                                         00E9  6788
                   5C    01    D0        00E9  6789 9$:      MOVL    #1,R12                      ; load number of bytes to check
                                         00EC  6790          $DS_BREAK
                00010058 9F    6E    FA  00EC                        CALLG   (SP), a#DS$BREAK
                     0000213B'EF    16    00F3  6791          JSB     CHECK_PACKET                ; go check continue
                                         00F9  6792          $DS_BNCOMPLETE  12$                 ; br = continue received
                      39 50    E9        00F9                        BLBC    R0, 12$
             0A 00000001'EF    01    E0  00FC  6793          BBS     #V_REPEAT_SEND,B_FLAGS2,10$ ; br = first try
                00000001'EF    02    88  0104  6794          BISB2   #M_REPEAT_SEND,B_FLAGS2     ; set repeat flag
                      FF59     31        010B  6795          BRW     2$                          ; try again
                   52    50    D0        010E  6796 10$:     MOVL    R0,R2                       ; save code for error report
                                         0111  6797          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT1_ERR,PRLINK=DATA_ERR_CONT
                      00001E4D'EF      DF  0111                        PUSHAL  DATA_ERR_CONT
                      0000183B'EF      DF  0117                        PUSHAL  T_INIT1_ERR
                                  00   DD  011D                        PUSHL   #0
                                  03   DD  011F                        PUSHL   #$ER
                                         0121      ;;; TEST 11, SUBTEST 0, ERROR 3
                000100D0 9F    04    FB  0121                        CALLS   #$$M, a#DS$ERRHARD
                                         0128  6798          $DS_BNCOMPLETE  11$
                      03 50    E9        0128                        BLBC    R0, 11$
                                         012B  6799          $DS_ABORT       TEST
                         50    D4        012B                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                               04        012D                        RET                         ; TERMINATE TEST
                                         012E  6800 11$:     $DS_ABORT
                00010020 9F    6C    FA  012E                        CALLG   (AP), a#DS$ABORT
                                         0135  6801 12$:
                                         0135  6802          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 11.1:   INITIALIZE
0135  6805 ;*
0135  6806 ; SUBTEST DESCRIPTION:
0135  6807 ;
0135  6808 ;       This subtest sends the TU58 a command packet to perform an initialization
0135  6809 ;       operation which puts the controller into a known ready state. While
0135  6810 ;       sending each byte of the packet, a timer is set which will time out if
0135  6811 ;       the ready bit in the transmitter processor register does not set
0135  6812 ;       within the alloted time. The same is done for the done bit in the
0135  6813 ;       receiver processor register while reading a byte from the TU58. When
0135  6814 ;       this is completed successfully, the returned end packet is compared to
0135  6815 ;       an expected end packet. If a time out occurs or bad data is
0135  6816 ;       encountered an error will be reported.
0135  6817 ;
0135  6818 ;
0135  6819 ; SUBTEST STEPS:
0135  6820 ;
0135  6821 ;       SUBTEST INITIALIZE
0135  6822 ;       :  Clear buffer
0135  6823 ;       :  Point to initialize command packet
0135  6824 ;       :  REPEAT
0135  6825 ;       :  :  Send command packet byte at a time
0135  6826 ;       :  :  Set timer
0135  6827 ;       :  :  IF timer expired AND no response
0135  6828 ;       :  :  :  THEN
0135  6829 ;       :  :  :  Report no response error
0135  6830 ;       :  :  :  Exit test
0135  6831 ;       :  :  ENDIF
0135  6832 ;       :  : UNTIL all bytes sent
0135  6833 ;       :  ENDREPEAT
0135  6834 ;       :  REPEAT
0135  6835 ;       :  :  Set timer
0135  6836 ;       :  :  IF timer expired AND done set
0135  6837 ;       :  :  :  THEN
0135  6838 ;       :  :  :  :  Read byte
0135  6839 ;       :  :  ENDIF
0135  6840 ;       :  : UNTIL timer expired AND done clear
0135  6841 ;       :  ENDREPEAT
0135  6842 ;       :  IF expected byte count NEQ actual byte count
0135  6843 ;       :  :  THEN
0135  6844 ;       :  :  :  Report error
0135  6845 ;       :  :  :  Exit test
0135  6846 ;       :  ENDIF
0135  6847 ;       :  Point to expected and actual end packet
0135  6848 ;       :  REPEAT
0135  6849 ;       :  :  IF data expected NEQ data received
0135  6850 ;       :  :  :  THEN
0135  6851 ;       :  :  :  Report error
0135  6852 ;       :  :  :  Exit test
0135  6853 ;       :  :  ENDIF
0135  6854 ;       :  : UNTIL all data checked
0135  6855 ;       :  ENDREPEAT
0135  6856 ;       ENDSUBTEST INITIALIZE
0135  6857 ;
0135  6858 ;
```

```
                                0135  6859 ;
                                0135  6860 ;
                                0135  6861 ;.page
                                0135  6862 ;-
                                0135  6863
                                0135  6864          $DS_BGNSUB
                                0135        T11_S1::
00010030 9F   000000CC'EF   FA  0135                  CALLG   $S$, a#DS$BGNSUB
                                0140  6865
              00000000'EF   94  0140  6866          CLRB    B_FLAGS                 ; initialize flags
           58 00000000'FF   9E  0146  6867          MOVAB   @A_BUFFER_BEGIN,R8      ; load buffer starting address
           59 00000400 8F   D0  014D  6868          MOVL    #1024,R9                ; do both pages
              00002134'EF   16  0154  6869          JSB     CLEAR_BUFFER            ; go clear buffers
           54 FFFB6C20 8F   D0  015A  6870          MOVL    #DELAY_TIME1,R4         ; load send packet delay time
           55 000002FC'EF   9E  0161  6871          MOVAB   MB_INIT_CMD,R5          ; point to init command packet
                 57   0E   D0  0168  6872          MOVL    #14,R7                  ; load transfer byte count
              0000203D'EF   16  016B  6873          JSB     SEND_TU58               ; send command packet
        24 00000000'EF   00   E1  0171  6874          BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                                0179  6875          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT2_ERR,PRLINK=NO_READY
              00001BEB'EF   DF  0179                  PUSHAL  NO_READY
              00001865'EF   DF  017F                  PUSHAL  T_INIT2_ERR
                        00  DD  0185                  PUSHL   #0
                        01  DD  0187                  PUSHL   #$ER
                                0189        ;;; TEST 11, SUBTEST 1, ERROR 1
           000100D0 9F   04   FB  0189                  CALLS   #$$M, a#DS$ERRHARD
                                0190  6876          $DS_BNCOMPLETE  1$
                     03 50   E9  0190                  BLBC    R0, 1$
                                0193  6877          $DS_ABORT       TEST
                        50   D4  0193                  CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                        04   0195                      RET                         ; TERMINATE TEST
                                0196  6878 1$:       $DS_ABORT
00010020 9F   6C   FA  0196                  CALLG   (AP), a#DS$ABORT
                                019D  6879
54   FFFB6C20 8F   D0  019D  6880 2$:       MOVL    #DELAY_TIME1,R4         ; load receive packet delay time
55   00000000'FF   9E  01A4  6881          MOVAB   @A_BUFFER_BEGIN,R5      ; load buffer address to store data
     57   55   0E   C1  01AB  6882          ADDL3   #14,R5,R7               ; load last expected address of data
          000020C8'EF   16  01AF  6883          JSB     MRECEIVE_TU58           ; go get data from TU58
5A   00000660'EF   9E  01B5  6884          MOVAB   MB_END_PACKET_1,R10     ; load address of expected end packet
5B   00000000'FF   9E  01BC  6885          MOVAB   @A_BUFFER_BEGIN,R11     ; load address of actual end packet
           57   55   D1  01C3  6886          CMPL    R5,R7                   ; check for correct number of bytes
                31   13  01C6  6887          BEQL    6$                      ; br = correct number of bytes
00000000'EF   08   88  01C8  6888          BISB2   #M_END_FLAG,B_FLAGS     ; set end error flag
                                01CF  6889 4$:       $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT2_ERR,PRLINK=REC_ERR,-
                                01CF  6890                           P1=#T_REC_END
              00001D2E'8F   DD  01CF                  PUSHL   #T_REC_END
              00001EB4'EF   DF  01D5                  PUSHAL  REC_ERR
              00001865'EF   DF  01DB                  PUSHAL  T_INIT2_ERR
                        00  DD  01E1                  PUSHL   #0
                        02  DD  01E3                  PUSHL   #$ER
                                01E5        ;;; TEST 11, SUBTEST 1, ERROR 2
00010000 9F   05   FB  01E5                  CALLS   #$$M, a#DS$ERRHARD
                                01EC  6891          $DS_BNCOMPLETE  5$
                     03 50   E9  01EC                  BLBC    R0, 5$
                                01EF  6892          $DS_ABORT       TEST
                        50   D4  01EF                  CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
```

```
                                04  01F1                        RET                         ; TERMINATE TEST
                                    01F2  6893 5$:      $DS_ABORT
          00010020 9F    6C     FA  01F2                        CALLG   (AP), a#DS$ABORT
                                    01F9  6894
                   5C    0E     D0  01F9  6895 6$:      MOVL    #14,R12                     ; load number of bytes to check
                                    01FC  6896          $DS_BREAK
          00010058 9F    6E     FA  01FC                        CALLG   (SP), a#DS$BREAK
               0000213B'EF      16  0203  6897          JSB     CHECK_PACKET                ; go check end packet
                                    0209  6898          $DS_BNCOMPLETE  7$                  ; br = no error
                      21 50     E9  0209                        BLBC    R0, 7$
                                    020C  6899          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT2_ERR,PRLINK=DATA_ERR_END
               00001E9D'EF      DF  020C                        PUSHAL  DATA_ERR_END
               00001865'EF      DF  0212                        PUSHAL  T_INIT2_ERR
                         00     DD  0218                        PUSHL   #0
                         03     DD  021A                        PUSHL   #$ER
                                    021C        ;;; TEST 11, SUBTEST 1, ERROR 3
          000100D0 9F    04     FB  021C                        CALLS   #$$M, a#DS$ERRHARD
                                    0223  6900          $DS_BCOMPLETE   7$                  ; continue if only data error
                      07 50     E8  0223                        BLBS    R0, 7$
                                    0226  6901          $DS_ABORT
          00010020 9F    6C     FA  0226                        CALLG   (AP), a#DS$ABORT
                                    022D  6902 7$:
                                    022D  6903
                                    022D  6904          $DS_ENDSUB
                                    022D        T11_S1_X:
    00010038 9F   000000CC'EF    FA  022D                        CALLG   $S$, a#DS$ENDSUB
                                    0238  6905
                                    0238  6906          $DS_PAGE
```

```
0238                    .SBTTL  SUBTEST 11.2:   SELF DIAGNOSTIC
0238   6909 ;*
0238   6910 ; SUBTEST DESCRIPTION:
0238   6911 ;
0238   6912 ;       This subtest sends the TU58 a command packet to run its internal
0238   6913 ;       diagnostic. While sending each byte of the packet,a timer is set which
0238   6914 ;       will time out if the ready bit in the transmitter processor register
0238   6915 ;       does not set within the alloted time. The same is done for the done
0238   6916 ;       bit in the receiver processor register while reading a byte from the
0238   6917 ;       TU58. When this is completed successfully, the returned end packet is
0238   6918 ;       compared to an expected end packet. If a time out occurs or bad data
0238   6919 ;       is encountered an error will be reported.
0238   6920 ;
0238   6921 ;
0238   6922 ; SUBTEST STEPS:
0238   6923 ;
0238   6924 ;       SUBTEST SELF DIAGNOSTIC
0238   6925 ;       : Clear buffer
0238   6926 ;       : Point to self diagnostic command packet
0238   6927 ;       : REPEAT
0238   6928 ;       : : Send command packet byte at a time
0238   6929 ;       : : Set timer
0238   6930 ;       : : IF timer expired AND no response
0238   6931 ;       : : : THEN
0238   6932 ;       : : : Report no response error
0238   6933 ;       : : : Exit test
0238   6934 ;       : : ENDIF
0238   6935 ;       : : UNTIL all bytes sent
0238   6936 ;       : ENDREPEAT
0238   6937 ;       : REPEAT
0238   6938 ;       : : Set timer
0238   6939 ;       : : IF timer expired AND done set
0238   6940 ;       : : : THEN
0238   6941 ;       : : : : Read byte
0238   6942 ;       : : ENDIF
0238   6943 ;       : : UNTIL timer expired AND done clear
0238   6944 ;       : ENDREPEAT
0238   6945 ;       : IF expected byte count NEQ actual byte count
0238   6946 ;       : : THEN
0238   6947 ;       : : : Report error
0238   6948 ;       : : : Exit test
0238   6949 ;       : ENDIF
0238   6950 ;       : Point to expected and actual data
0238   6951 ;       : REPEAT
0238   6952 ;       : : IF expected data NEQ received data
0238   6953 ;       : : : THEN
0238   6954 ;       : : : Report data error
0238   6955 ;       : : : Exit test
0238   6956 ;       : : ENDIF
0238   6957 ;       : : UNTIL all data checked
0238   6958 ;       : ENDREPEAT
0238   6959 ;       ENDSUBTEST SELF DIAGNOSTIC
0238   6960 ;
0238   6961 ;
0238   6962 ;
```

```
                                0238  6963 ;.page
                                0238  6964 ;-
                                0238  6965         $DS_BGNSUB
                                0238         T11_S2::
00010030 9F   000000D8'EF   FA  0238                 CALLG   $S$, a#DS$BGNSUB
                                0243  6966
                                0243  6967
         00000000'EF    94      0243  6968         CLRB    B_FLAGS                 ; initialize flags
      58 00000000'FF    9E      0249  6969         MOVAB   aA_BUFFER_BEGIN,R8      ; load buffer starting address
      59 00000400 8F    D0      0250  6970         MOVL    #1024,R9                ; do both pages
         00002134'EF    16      0257  6971         JSB     CLEAR_BUFFER            ; go clear buffers
      54 FFFB6C20 8F    D0      025D  6972         MOVL    #DELAY_TIME1,R4         ; load send packet delay time
      55 00000318'EF    9E      0264  6973         MOVAB   MB_DIAGNOSE_CMD,R5      ; point to diagnose command packet
            57   0E     D0      026B  6974         MOVL    #14,R7                  ; load transfer byte count
         0000203D'EF    16      026E  6975         JSB     SEND_TU58               ; send command packet
   24 00000000'EF    00      E1  0274  6976         BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                                027C  6977         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_SLF_DIAG_ERR,PRLINK=NO_READY
         00001BEB'EF    DF      027C                 PUSHAL  NO_READY
         00001888'EF    DF      0282                 PUSHAL  T_SLF_DIAG_ERR
                  00    DD      0288                 PUSHL   #0
                  01    DD      028A                 PUSHL   #$ER
                                028C         ;;; TEST 11, SUBTEST 2, ERROR 1
   000100D0 9F    04    FB      028C                 CALLS   #$$M, a#DS$ERRHARD
                                0293  6978         $DS_BNCOMPLETE  1$
            03 50    E9      0293                 BLBC    R0, 1$
                                0296  6979         $DS_ABORT       TEST
                  50    D4      0296                 CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                  04    0298                 RET                     ; TERMINATE TEST
                                0299  6980 1$:      $DS_ABORT
00010020 9F   6C    FA      0299                 CALLG   (AP), a#DS$ABORT
                                02A0  6981
54   FFF3CB00 8F    D0      02A0  6982 2$:      MOVL    #DELAY_TIME3,R4         ; load receive packet delay time
55   00000000'FF    9E      02A7  6983         MOVAB   aA_BUFFER_BEGIN,R5      ; load buffer address to store data
   57   55   0E     C1      02AE  6984         ADDL3   #14,R5,R7               ; load last expected address of data
     000020C8'EF    16      02B2  6985         JSB     MRECEIVE_TU58           ; go get data from TU58
5A   00000660'EF    9E      02B8  6986         MOVAB   MB_END_PACKET_1,R10     ; load address of expected end packet
5B   00000000'FF    9E      02BF  6987         MOVAB   aA_BUFFER_BEGIN,R11     ; load address of actual end packet
        57   55     D1      02C6  6988         CMPL    R5,R7                   ; check for expected number of bytes
             31     13      02C9  6989         BEQL    6$                      ; br = correct number of bytes
00000000'EF   08    88      02CB  6990         BISB2   #M_END_FLAG,B_FLAGS     ; set end error flag
                                02D2  6991 4$:      $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_SLF_DIAG_ERR,PRLINK=REC_ERR,-
                                02D2  6992                         P1=#T_REC_END
     00001D2E'8F    DD      02D2                 PUSHL   #T_REC_END
     00001EB4'EF    DF      02D8                 PUSHAL  REC_ERR
     00001888'EF    DF      02DE                 PUSHAL  T_SLF_DIAG_ERR
                    00      DD  02E4             PUSHL   #0
                    02      DD  02E6             PUSHL   #$ER
                                02E8         ;;; TEST 11, SUBTEST 2, ERROR 2
000100D0 9F   05    FB      02E8                 CALLS   #$$M, a#DS$ERRHARD
                                02EF  6993         $DS_BNCOMPLETE  5$
            03 50    E9      02EF                 BLBC    R0, 5$
                                02F2  6994         $DS_ABORT       TEST
                  50    D4      02F2                 CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                  04    02F4                 RET                     ; TERMINATE TEST
                                02F5  6995 5$:      $DS_ABORT
```

```
                00010020 9F    6C    FA  02F5                        CALLG   (AP), a#DS$ABORT
                                         02FC  6996
                         5C    0E    D0  02FC  6997 6$:     MOVL    #14,R12                 ; load number of bytes to check
                                         02FF  6998         $DS_BREAK
                00010058 9F    6E    FA  02FF                        CALLG   (SP), a#DS$BREAK
                     0000213B'EF    16  0306  6999         JSB     CHECK_PACKET            ; go check end packet
                                         030C  7000         $DS_BNCOMPLETE  7$              ; br = no error
                           21 50    E9  030C                        BLBC    R0, 7$
                                         030F  7001         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_SLF_DIAG_ERR,PRLINK=DATA_ERR_END
                     00001E9D'EF    DF  030F                        PUSHAL  DATA_ERR_END
                     00001888'EF    DF  0315                        PUSHAL  T_SLF_DIAG_ERR
                              00    DD  031B                        PUSHL   #0
                              03    DD  031D                        PUSHL   #$ER
                                         031F       ;;; TEST 11, SUBTEST 2, ERROR 3
                000100D0 9F    04    FB  031F                        CALLS   #$$M, a#DS$ERRHARD
                                         0326  7002         $DS_BCOMPLETE   7$              ; continue if only data error
                           07 50    E8  0326                        BLBS    R0, 7$
                                         0329  7003         $DS_ABORT
                00010020 9F    6C    FA  0329                        CALLG   (AP), a#DS$ABORT
                                         0330  7004 7$:
                                         0330  7005
                                         0330  7006         $DS_ENDSUB
                                         0330       T11_S2_X:
            00010038 9F    000000D8'EF    FA  0330                        CALLG   $S$, a#DS$ENDSUB
                                         033B  7007
                                         033B  7008         $DS_PAGE
```

```
                        .SBTTL  SUBTEST 11.3:   NOP
                ;+
                ; SUBTEST DESCRIPTION:
                ;
                ;       This subtest sends the TU58 a command packet to perform a no
                ;       operation. While sending each byte of the packet, a timer is set which
                ;       will time out if the ready bit in the transmitter processor register
                ;       does not set within the alloted time. The same is done for the done
                ;       bit in the receiver processor register while reading a byte from the
                ;       TU58. When this is completed successfully, the returned end packet is
                ;       compared to an expected end packet. If a time out occurs while expecting
                ;       a byte transfer or bad data is encountered an error will be reported.
                ;
                ;
                ; SUBTEST STEPS:
                ;
                ;       SUBTEST NOP
                ;       :  Clear buffer
                ;       :  Point to no operation command packet
                ;       :  REPEAT
                ;       :  :  Send command packet byte at a time
                ;       :  :  Set timer
                ;       :  :  IF timer expired AND no response
                ;       :  :  :  THEN
                ;       :  :  :  Report no response error
                ;       :  :  :  Exit test
                ;       :  :  ENDIF
                ;       :  : UNTIL all bytes sent
                ;       :  ENDREPEAT
                ;       :  REPEAT
                ;       :  :  Set timer
                ;       :  :  IF timer expired AND done set
                ;       :  :  :  THEN
                ;       :  :  :  :  Read byte
                ;       :  :  ENDIF
                ;       :  : UNTIL timer expired AND done clear
                ;       :  ENDREPEAT
                ;       :  IF expected byte count NEQ actual byte count
                ;       :  :  THEN
                ;       :  :  :  Report error
                ;       :  :  :  Exit test
                ;       :  ENDIF
                ;       :  Point to expected and actual end packet
                ;       :  REPEAT
                ;       :  :  IF expected data NEQ received data
                ;       :  :  :  THEN
                ;       :  :  :  Report data error
                ;       :  :  :  Exit test
                ;       :  :  ENDIF
                ;       :  : UNTIL all data checked
                ;       :  ENDREPEAT
                ;       ENDSUBTEST NOP
                ;
                ;
                ;
```

```
                                    033B  7065 ;.page
                                    033B  7066 ;-
                                    033B  7067          $DS_BGNSUB
                                    033B        T11_S3::
00010030 9F   000000E4'EF    FA     033B                CALLG   $S$, a#DS$BGNSUB
                                    0346  7068
                                    0346  7069
         00000000'EF    94          0346  7070        CLRB    B_FLAGS                 ; initialize flags
      58 00000000'FF    9E          034C  7071        MOVAB   aA_BUFFER_BEGIN,R8      ; load buffer starting address
      59 00000400 8F    D0          0353  7072        MOVL    #1024,R9                ; do both pages
         00002134'EF    16          035A  7073        JSB     CLEAR_BUFFER            ; go clear buffers
      54 FFFB6C20 8F    D0          0360  7074        MOVL    #DELAY_TIME1,R4         ; load send packet delay time
      55 0000030A'EF    9E          0367  7075        MOVAB   MB_NOP_CMD,R5           ; point to init command packet
            57   0E    D0          036E  7076        MOVL    #14,R7                  ; load transfer byte count
         0000203D'EF    16          0371  7077        JSB     SEND_TU58               ; send command packet
   24 00000000'EF   00    E1       0377  7078        BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                                    037F  7079        $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_NOP_ERR,PRLINK=NO_READY
         00001BEB'EF    DF          037F                PUSHAL  NO_READY
         000018AD'EF    DF          0385                PUSHAL  T_NOP_ERR
                  00    DD          038B                PUSHL   #0
                  01    DD          038D                PUSHL   #$ER
                                    038F        ;;; TEST 11, SUBTEST 3, ERROR 1
      000100D0 9F   04    FB        038F                CALLS   #$$M, a#DS$ERRHARD
                                    0396  7080        $DS_BNCOMPLETE  1$
            03 50   E9              0396                BLBC    R0, 1$
                                    0399  7081        $DS_ABORT       TEST
                  50    D4          0399                CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                  04    039B                RET                                     ; TERMINATE TEST
                                    039C  7082 1$:      $DS_ABORT
00010020 9F   6C    FA              039C                CALLG   (AP), a#DS$ABORT
                                    03A3  7083
54   FFFB6C20 8F    D0              03A3  7084 2$:      MOVL    #DELAY_TIME1,R4         ; load receive packet delay time
55    00000000'FF   9E              03AA  7085          MOVAB   aA_BUFFER_BEGIN,R5      ; load buffer address to store data
   57   55    0E    C1              03B1  7086          ADDL3   #14,R5,R7               ; load last expected address of data
      000020C8'EF   16              03B5  7087          JSB     MRECEIVE_TU58           ; go get data from TU58
5A    00000660'EF   9E              03BB  7088          MOVAB   MB_END_PACKET_1,R10     ; load address of expected end packet
5B    00000000'FF   9E              03C2  7089          MOVAB   aA_BUFFER_BEGIN,R11     ; load address of actual end packet
         57   55    D1              03C9  7090          CMPL    R5,R7                   ; check for expected number of bytes
                31   13              03CC  7091          BEQL    6$                      ; br = correct nbumber of bytes
00000000'EF   08    88              03CE  7092          BISB2   #M_END_FLAG,B_FLAGS     ; set end error flag
                                    03D5  7093 4$:      $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_NOP_ERR,PRLINK=REC_ERR,-
                                    03D5  7094                          P1=#T_REC_END
      00001D2E'8F   DD              03D5                PUSHL   #T_REC_END
      00001EB4'EF   DF              03DB                PUSHAL  REC_ERR
      000018AD'EF   DF              03E1                PUSHAL  T_NOP_ERR
                00  DD              03E7                PUSHL   #0
                02  DD              03E9                PUSHL   #$ER
                                    03EB        ;;; TEST 11, SUBTEST 3, ERROR 2
000100D0 9F   05    FB              03EB                CALLS   #$$M, a#DS$ERRHARD
                                    03F2  7095        $DS_BNCOMPLETE  5$
            03 50   E9              03F2                BLBC    R0, 5$
                                    03F5  7096        $DS_ABORT       TEST
                50  D4              03F5                CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                04  03F7                RET                                     ; TERMINATE TEST
                                    03F8  7097 5$:      $DS_ABORT
```

```
00010020 9F   6C   FA  03F8                        CALLG   (AP), a#DS$ABORT
                      03FF  7098
         5C   0E   D0  03FF  7099 6$:     MOVL    #14,R12                 ; load number of bytes to check
                      0402  7100          $DS_BREAK
00010058 9F   6E   FA  0402                        CALLG   (SP), a#DS$BREAK
     0000213B'EF   16  0409  7101          JSB     CHECK_PACKET            ; go check end packet
                      040F  7102          $DS_BNCOMPLETE  7$              ; br = no error
           21 50   E9  040F                        BLBC    R0, 7$
                      0412  7103          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_NOP_ERR,PRLINK=DATA_ERR_END
     00001E9D'EF   DF  0412                        PUSHAL  DATA_ERR_END
     000018AD'EF   DF  0418                        PUSHAL  T_NOP_ERR
           00      DD  041E                        PUSHL   #0
           03      DD  0420                        PUSHL   #$ER
                      0422       ;;; TEST 11, SUBTEST 3, ERROR 3
000100D0 9F   04   FB  0422                        CALLS   #$$M, a#DS$ERRHARD
                      0429  7104          $DS_BCOMPLETE   7$              ; continue if only data error
           07 50   E8  0429                        BLBS    R0, 7$
                      042C  7105          $DS_ABORT
00010020 9F   6C   FA  042C                        CALLG   (AP), a#DS$ABORT
                      0433  7106 7$:
                      0433  7107
                      0433  7108          $DS_ENDSUB
                      0433       T11_S3_X:
00010038 9F   000000E4'EF   FA  0433                CALLG   $S$, a#DS$ENDSUB
                      043E  7109          $DS_CLRVEC_S    VECTOR=#SCB$L_TIMER
     000000C0 8F   DD  043E                        PUSHL   #SCB$L_TIMER
00010168 9F   01   FB  0444                        CALLS   #1, a#DS$CLRVEC
                      044B  7110
                      044B  7111          $DS_ENDTEST
         50   01   D0  044B                        MOVL    #1, R0          ; NORMAL EXIT
                      044E       TEST_011_X::
00010058 9F   6E   FA  044E                        CALLG   (SP), a#DS$BREAK
                      0455                        RET                     ; RETURN TO TEST SEQUENCER
                      0456  7112
                      0456  7113          $DS_PAGE
```

```
                                0456                    .SBTTL  TEST 12:  TU58 EXERCISER READ/WRITE (WITH MRSP)
                               00000000                         .PSECT  TEST_012, PAGE, NOWRT
                                0028
                                0028  7116 ;++
                                0028  7117 ; Test description:
                                0028  7118 ;
                                0028  7119 ;       This test exercises the TU58 on the VAX-11/750 by performing
                                0028  7120 ;       position, read (normal and two versions of modified) and write
                                0028  7121 ;       (normal and two versions of modified) commands. Zero padding of
                                0028  7122 ;       blocks and records are also checked for write commands. All end and
                                0028  7123 ;       data packets are checked for errors. Timers are setup to time out if
                                0028  7124 ;       a byte transaction between the host and TU58 is not completed within
                                0028  7125 ;       a reasonable amount of time. If any errors are detected, they are
                                0028  7126 ;       reported with all available information pertaining to the failure.
                                0028  7127 ;
                                0028  7128 ;
                                0028  7129 ; Assumptions:
                                0028  7130 ;
                                0028  7131 ;       This test assumes the scratch tape cartridge used is in good
                                0028  7132 ;       condition. If a marginal tape is used bits may be dropped during the
                                0028  7133 ;       read modified test, which reads with an increased threshold and will
                                0028  7134 ;       consequently report false data errors. Any tape may be used, but
                                0028  7135 ;       existing data will be destroyed. Before the tape is written, the first
                                0028  7136 ;       directory will be read. If the directory read is not "scrat.ch", the
                                0028  7137 ;       operator will be prompted to either overwrite the tape or abort this
                                0028  7138 ;       test. If overwriting the tape is chosen, an attempt to write
                                0028  7139 ;       "scrat.ch" in the first directory area will be made. If an operational
                                0028  7140 ;       error occurs it will be reported, but error detection in this subtest
                                0028  7141 ;       is limited and the primary function is to give the operator an
                                0028  7142 ;       opportunity to remove a tape containing valuable data from the drive
                                0028  7143 ;       and inserting a scratch tape before it is destroyed.
                                0028  7144 ;
                                0028  7145 ;
                                0028  7146 ;.page
                                0028  7147 ;--
                                0028  7148          $DS_BGNTEST     <DEFAULT,TU58,ALL>
                                0028              DATA_012:
                            00000000  0028                  .LONG   0                       ; TEST ARGUMENT TABLE TERMINATOR
                                002C              TEST_012::
                                0000  002C                  .WORD   ^M<>                    ; ENTRY MASK
                                002E  7149
                                002E  7150
                                002E  7151          ; Set Up
                                002E  7152
                                002E  7153          $DS_SETVEC_S    VECTOR=#SCB$L_TIMER,SRVADR=TIMER_SERVICE
                                  00    DD  002E                  PUSHL   #0
                       00002150'EF    DF  0030                  PUSHAL  TIMER_SERVICE
                       000000C0 8F    DD  0036                  PUSHL   #SCB$L_TIMER
                 00010160 9F    03    FB  003C                  CALLS   #3, @#DS$SETVEC
                                0043  7154
                 58    00000000'FF    9E  0043  7155 1$:        MOVAB   @A_BUFFER_BEGIN,R8      ; load buffer starting address
00000013'EF      58    0000042E 8F    C1  004A  7156            ADDL3   #1070,R8,BUF_LIM        ; construct upper buffer limit
                 59    00000400 8F    D0  0056  7157            MOVL    #1024,R9                ; do both pages
                       00002134'EF    16  005D  7158            JSB     CLEAR_BUFFER            ; go clear buffers
                                0063  7159
```

```
                00000000'EF   94   0063  7160          CLRB    B_FLAGS                    ; init flags
                00000001'EF   94   0069  7161          CLRB    B_FLAGS2                   ; init flags
                00001FCB'EF   16   006F  7162 2$:       JSB     MINIT_SEQUENCE             ; initialize drive
           5A   00000023'EF   9E   0075  7163          MOVAB   B_CONTINUE,R10             ; load expected data address
           5B   00000000'FF   9E   007C  7164          MOVAB   @A_BUFFER_BEGIN,R11        ; load actual data address
        2C 00000000'EF    04   E1   0083  7165          BBC     #V_SEND_FLAG,B_FLAGS,5$ ; br = no send error
        DC 00000001'EF    01   E3   008B  7166          BBCS    #V_REPEAT_SEND,B_FLAGS2,2$ ; br = first try and set flag
                                    0093  7167          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT1_ERR,PRLINK=NO_READY
                00001BEB'EF   DF   0093                        PUSHAL  NO_READY
                0000183B'EF   DF   0099                        PUSHAL  T_INIT1_ERR
                        00    DD   009F                        PUSHL   #0
                        01    DD   00A1                        PUSHL   #$ER
                                   00A3          ;;; TEST 12, SUBTEST 0, ERROR 1
           000100D0 9F    04   FB   00A3                        CALLS   #$$M, @#DS$ERRHARD
                                    00AA  7168          $DS_BNCOMPLETE  3$
                     03 50    E9   00AA                        BLBC    R0, 3$
                                    00AD  7169          $DS_ABORT       TEST
                        50    D4   00AD                        CLRL    R0                 ; SEND A WARNING TO THE SUPERVISOR
                              04   00AF                        RET                        ; TERMINATE TEST
                                    00B0  7170 3$:      $DS_ABORT
           00010020 9F    6C   FA   00B0                        CALLG   (AP), @#DS$ABORT
                                    00B7  7171
        32 00000000'EF    01   E1   00B7  7172 5$:       BBC     #V_RECEIVE_FLAG,B_FLAGS,9$ ; br = no receive error
        A8 00000001'EF    01   E3   00BF  7173          BBCS    #V_REPEAT_SEND,B_FLAGS2,2$ ; br = first try and set flag
                                    00C7  7174 7$:      $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT1_ERR,PRLINK=REC_ERR,-
                                    00C7  7175                      P1=#T_REC_CONT
                00001D47'8F   DD   00C7                        PUSHL   #T_REC_CONT
                00001EB4'EF   DF   00CD                        PUSHAL  REC_ERR
                0000183B'EF   DF   00D3                        PUSHAL  T_INIT1_ERR
                        00    DD   00D9                        PUSHL   #0
                        02    DD   00DB                        PUSHL   #$ER
                                   00DD          ;;; TEST 12, SUBTEST 0, ERROR 2
           000100D0 9F    05   FB   00DD                        CALLS   #$$M, @#DS$ERRHARD
                                    00E4  7176          $DS_BNCOMPLETE  8$
                     03 50    E9   00E4                        BLBC    R0, 8$
                                    00E7  7177          $DS_ABORT       TEST
                        50    D4   00E7                        CLRL    R0                 ; SEND A WARNING TO THE SUPERVISOR
                              04   00E9                        RET                        ; TERMINATE TEST
                                    00EA  7178 8$:      $DS_ABORT
           00010020 9F    6C   FA   00EA                        CALLG   (AP), @#DS$ABORT
                                    00F1  7179
                     5C    01   D0   00F1  7180 9$:       MOVL    #1,R12                     ; load number of bytes to check
                                    00F4  7181          $DS_BREAK
           00010058 9F    6E   FA   00F4                        CALLG   (SP), @#DS$BREAK
                0000213B'EF   16   00FB  7182          JSB     CHECK_PACKET               ; go check continue packet
                                    0101  7183          $DS_BNCOMPLETE  12$
                     39 50    E9   0101                        BLBC    R0, 12$
        0A 00000001'EF    01   E0   0104  7184          BBS     #V_REPEAT_SEND,B_FLAGS2,10$ ; br = first try and set flag
           00000001'EF    02   88   010C  7185          BISB2   #M_REPEAT_SEND,B_FLAGS2
                        FF59   31   0113  7186          BRW     2$
                     52   50    D0   0116  7187 10$:     MOVL    R0,R2                      ; save code for error report
                                    0119  7188          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_INIT1_ERR,PRLINK=DATA_ERR_CONT
                00001E4D'EF   DF   0119                        PUSHAL  DATA_ERR_CONT
                0000183B'EF   DF   011F                        PUSHAL  T_INIT1_ERR
                        00    DD   0125                        PUSHL   #0
```

```
                  03   DD  0127                          PUSHL   #$ER
                           0129        ;;; TEST 12, SUBTEST 0, ERROR 3
000100D0 9F       04   FB  0129                          CALLS   #$$M, @#DS$ERRHARD
                           0130  7189          $DS_BNCOMPLETE  11$
               03 50   E9  0130                          BLBC    R0, 11$
                           0133  7190          $DS_ABORT       TEST
                  50   D4  0133                          CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                       04  0135                          RET                         ; TERMINATE TEST
                           0136  7191 11$:     $DS_ABORT
00010020 9F       6C   FA  0136                          CALLG   (AP), @#DS$ABORT
                           013D  7192 12$:
                           013D  7193          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 12.1:   READ DIRECTORY
013D  7196 ;+
013D  7197 ; SUBTEST DESCRIPTION:
013D  7198 ;
013D  7199 ;       This subtest sends the TU58 a command packet to read the first entry
013D  7200 ;       in the directory area of the tape. A timer is set which will
013D  7201 ;       time out if the ready bit in the transmitter processor register does
013D  7202 ;       not set within the allotted time. A second timer is set which will
013D  7203 ;       time out if the done bit in the receiver processor register does not
013D  7204 ;       set within the allotted amount of time. If either of these timers
013D  7205 ;       expires while expecting a data transfer an error will be reported
013D  7206 ;       stating the conditions existing at the time of failure.
013D  7207 ;       The returned data packet is examined to see if the directory on the
013D  7208 ;       tape is "scrat.ch". If it is a scratch tape testing continues; if not,
013D  7209 ;       the operator will be prompted to either abort the TU58 exerciser test
013D  7210 ;       or overwrite the tape in the drive. Before entering the appropriate
013D  7211 ;       response on the TTY, the tape cartridge may be replaced with a scratch
013D  7212 ;       tape. In the case of an overwrite, the TU58 will be sent a write
013D  7213 ;       command  packet to write "scrat.ch" in the directory.  Timers are set
013D  7214 ;       which will time out if the appropriate bits do not set within allotted
013D  7215 ;       times. If an error occurs all appropriate information will be
013D  7216 ;       reported. This subtest is not primarily used for error detection, if an
013D  7217 ;       error is encountered, testing should continue with the next subtest
013D  7218 ;       for diagnosis.
013D  7219 ;
013D  7220 ;
013D  7221 ; SUBTEST STEPS:
013D  7222 ;
013D  7223 ;             SUBTEST READ DIRECTORY
013D  7224 ;             :  Clear buffer
013D  7225 ;             :  Point to read command packet
013D  7226 ;             :  REPEAT
013D  7227 ;             :  :  Send byte of command packet
013D  7228 ;             :  :  Set timer
013D  7229 ;             :  :  IF no response AND timer expired
013D  7230 ;             :  :  :  THEN
013D  7231 ;             :  :  :  Report no response error
013D  7232 ;             :  :  :  Exit test
013D  7233 ;             :  :  ENDIF
013D  7234 ;             :  : UNTIL all bytes sent
013D  7235 ;             :  ENDREPEAT
013D  7236 ;             :  REPEAT
013D  7237 ;             :  :  Set timer
013D  7238 ;             :  :  IF timer expired AND done set
013D  7239 ;             :  :  :  THEN
013D  7240 ;             :  :  :  :  Read byte
013D  7241 ;             :  :  ENDIF
013D  7242 ;             :  : UNTIL timer expired AND done clear
013D  7243 ;             :  ENDREPEAT
013D  7244 ;             :  IF expected byte count NEQ actual byte count
013D  7245 ;             :  :  THEN
013D  7246 ;             :  :  :  Report error
013D  7247 ;             :  :  :  Exit test
013D  7248 ;             :  ENDIF
013D  7249 ;             :  Examine data for first directory on tape
```

```
013D  7250 ;       :  IF directory NEQ scrat.ch
013D  7251 ;       :  :  THEN
013D  7252 ;       :  :  WHILE write directory flag EQL zero DO
013D  7253 ;       :  :  :  Prompt operator to overwrite directory
013D  7254 ;       :  :  :  IF response EQL no
013D  7255 ;       :  :  :  :  THEN
013D  7256 ;       :  :  :  :  Exit test
013D  7257 ;       :  :  :  ENDIF
013D  7258 ;       :  :  :  IF response EQL yes
013D  7259 ;       :  :  :  :  THEN
013D  7260 ;       :  :  :  :  Set write directory flag
013D  7261 ;       :  :  :  :  Point to write directory command packet
013D  7262 ;       :  :  :  :  REPEAT
013D  7263 ;       :  :  :  :  :  Send command packet byte at a time
013D  7264 ;       :  :  :  :  :  Set timer
013D  7265 ;       :  :  :  :  :  IF timer expired AND no response
013D  7266 ;       :  :  :  :  :  :  THEN
013D  7267 ;       :  :  :  :  :  :  Report no response error
013D  7268 ;       :  :  :  :  :  :  Exit test
013D  7269 ;       :  :  :  :  :  ENDIF
013D  7270 ;       :  :  :  :  : UNTIL all bytes sent
013D  7271 ;       :  :  :  :  ENDREPEAT
013D  7272 ;       :  :  :  :  Wait for continue
013D  7273 ;       :  :  :  :  Set timer
013D  7274 ;       :  :  :  :  IF timer expired AND no response
013D  7275 ;       :  :  :  :  :  THEN
013D  7276 ;       :  :  :  :  :  Report no response error
013D  7277 ;       :  :  :  :  :  Exit test
013D  7278 ;       :  :  :  :  ENDIF
013D  7279 ;       :  :  :  :  Point to data packet with "scrat.ch" directory
013D  7280 ;       :  :  :  :  REPEAT
013D  7281 ;       :  :  :  :  :  Send data packet byte at a time
013D  7282 ;       :  :  :  :  :  Set timer
013D  7283 ;       :  :  :  :  :  IF timer expired AND no response
013D  7284 ;       :  :  :  :  :  :  THEN
013D  7285 ;       :  :  :  :  :  :  Report no response error
013D  7286 ;       :  :  :  :  :  :  Exit test
013D  7287 ;       :  :  :  :  :  ENDIF
013D  7288 ;       :  :  :  :  : UNTIL all bytes sent
013D  7289 ;       :  :  :  :  ENDREPEAT
013D  7290 ;       :  :  :  :  REPEAT
013D  7291 ;       :  :  :  :  :  Read end packet into buffer byte at a time
013D  7292 ;       :  :  :  :  :  Set timer
013D  7293 ;       :  :  :  :  :  IF timer expired AND no response
013D  7294 ;       :  :  :  :  :  :  THEN
013D  7295 ;       :  :  :  :  :  :  Report no response error
013D  7296 ;       :  :  :  :  :  :  Exit test
013D  7297 ;       :  :  :  :  :  ENDIF
013D  7298 ;       :  :  :  :  :  : UNTIL all bytes read
013D  7299 ;       :  :  :  :  ENDREPEAT
013D  7300 ;       :  :  :  :  Point to expected and received end packets
013D  7301 ;       :  :  :  :  REPEAT
013D  7302 ;       :  :  :  :  :  IF expected data NEQ received data
013D  7303 ;       :  :  :  :  :  :  THEN
013D  7304 ;       :  :  :  :  :  :  Report data error
```

```
                                013D  7305 ;       :  :  :  :  :  :  Exit subtest
                                013D  7306 ;       :  :  :  :  :  ENDIF
                                013D  7307 ;       :  :  :  :  : UNTIL all bytes checked
                                013D  7308 ;       :  :  :  :  ENDREPEAT
                                013D  7309 ;       :  :  :  ENDIF
                                013D  7310 ;       :  :  ENDWHILE
                                013D  7311 ;       :  ENDIF
                                013D  7312 ;       ENDSUBTEST READ DIRECTORY
                                013D  7313 ;
                                013D  7314 ;
                                013D  7315 ;
                                013D  7316 ;.page
                                013D  7317 ;-
                                013D  7318
                                013D  7319
                                013D  7320          $DS_BGNSUB
                                013D        T12_S1::
00010030 9F   000000F0'EF   FA  013D                CALLG   $S$, a#DS$BGNSUB
                                0148  7321                                    ; clear buffers
         00000000'EF   94   0148  7322          CLRB    B_FLAGS              ; initialize flags
      58 00000000'FF   9E   014E  7323          MOVAB   aÃ_BUFFER_BEGIN,R8   ; load buffer starting address
      59 00000400 8F   D0   0155  7324          MOVL    #1024,R9             ; do two pages
         00002134'EF   16   015C  7325          JSB     CLEAR_BUFFER         ; go clear buffers
                                0162  7326                                    ; send read command packet
      54 FF7E4CE0 8F   D0   0162  7327          MOVL    #DELAY_TIME7,R4      ; load send packet delay time
      55 00000326'EF   9E   0169  7328          MOVAB   MB_READ_1_CMD,R5             ; point to read command packet
            57   0E   D0   0170  7329          MOVL    #14,R7               ; load transfer byte count
         0000203D'EF   16   0173  7330          JSB     SEND_TU58            ; send command packet
   24 00000000'EF   00   E1   0179  7331          BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                                0181  7332          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=NO_READY
         00001BEB'EF   DF   0181                PUSHAL  NO_READY
         00001931'EF   DF   0187                PUSHAL  T_RD_REC_ERR
                  00   DD   018D                PUSHL   #0
                  01   DD   018F                PUSHL   #$ER
                                0191      ;;; TEST 12, SUBTEST 1, ERROR 1
   000100D0 9F   04   FB   0191                CALLS   #$$M, a#DS$ERRHARD
                                0198  7333          $DS_BNCOMPLETE  1$
               03 50   E9   0198                BLBC    R0, 1$
                                019B  7334          $DS_ABORT       TEST
                  50   D4   019B                CLRL    R0                   ; SEND A WARNING TO THE SUPERVISOR
                  04   019D                RET                          ; TERMINATE TEST
                                019E  7335 1$:      $DS_ABORT
   00010020 9F   6C   FA   019E                CALLG   (AP), a#DS$ABORT
                                01A5  7336                                    ; read data and end packet
   54 FAEF00C0 8F   D0   01A5  7337 2$:      MOVL    #DELAY_TIME8,R4      ; load receive packet delay time
   55 00000000'FF   9E   01AC  7338          MOVAB   aA_BUFFER_BEGIN,R5   ; load buffer address to store data
57 55 00000092 8F   C1   01B3  7339          ADDL3   #146,R5,R7           ; load last expected address of data
      000020C8'EF   16   01BB  7340          JSB     MRECEIVE_TU58        ; go get data from TU58
            57   55   D1   01C1  7341          CMPL    R5,R7                ; check for correct number of bytes
                  24   13   01C4  7342          BEQL    6$                   ; br = correct number of bytes
                                01C6  7343          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=MSG_1
         00001AD6'EF   DF   01C6                PUSHAL  MSG_1
         00001931'EF   DF   01CC                PUSHAL  T_RD_REC_ERR
                  00   DD   01D2                PUSHL   #0
                  02   DD   01D4                PUSHL   #$ER
```

```
                                01D6          ;;; TEST 12, SUBTEST 1, ERROR 2
000100D0 9F   04   FB           01D6                  CALLS   #$$M, a#DS$ERRHARD
                                01DD  7344            $DS_BNCOMPLETE  4$
          03 50   E9            01DD                  BLBC    R0, 4$
                                01E0  7345            $DS_ABORT       TEST
             50   D4            01E0                  CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                  04            01E2                  RET                     ; TERMINATE TEST
                                01E3  7346
                                01E3  7347 4$:        $DS_ABORT
00010020 9F   6C   FA           01E3                  CALLG   (AP), a#DS$ABORT
                                01EA  7348                                    ; check end packet
5A  0000066E'EF    9E           01EA  7349 6$:        MOVAB   MB_END_PACKET_2,R10     ; load address of expected end packet
5B  00000000'FF    9E           01F1  7350            MOVAB   @A_BUFFER_BEGIN,R11     ; load address of actual end packet
5B  00000084 8F    C0           01F8  7351            ADDL2   #132,R11                ; skip over data packet in buffer
       5C   0E     D0           01FF  7352            MOVL    #14,R12                 ; load number of bytes to check
                                0202  7353            $DS_BREAK
00010058 9F   6E   FA           0202                  CALLG   (SP), a#DS$BREAK
     0000213B'EF   16           0209  7354            JSB     CHECK_PACKET            ; go check end packet
                                020F  7355            $DS_BNCOMPLETE  7$              ; br = no error
          21 50   E9            020F                  BLBC    R0, 7$
                                0212  7356            $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=DATA_ERR_END
     00001E9D'EF   DF           0212                  PUSHAL  DATA_ERR_END
     00001931'EF   DF           0218                  PUSHAL  T_RD_REC_ERR
             00    DD           021E                  PUSHL   #0
             03    DD           0220                  PUSHL   #$ER
                                0222          ;;; TEST 12, SUBTEST 1, ERROR 3
000100D0 9F   04   FB           0222                  CALLS   #$$M, a#DS$ERRHARD
                                0229  7357            $DS_BCOMPLETE   7$              ; br = data error, but continue
          07 50   E8            0229                  BLBS    R0, 7$
                                022C  7358            $DS_ABORT
00010020 9F   6C   FA           022C                  CALLG   (AP), a#DS$ABORT
                                0233  7359                                    ; check first directory entry
5A  000006EC'EF    9E           0233  7360 7$:        MOVAB   B_DATA_PKT_1,R10        ; load address of expected data packet
       5A   0E     C0           023A  7361            ADDL2   #14,R10                 ; point to expected first directory entry
5B  00000000'FF    9E           023D  7362            MOVAB   @A_BUFFER_BEGIN,R11     ; load address of actual data packet
       5B   0E     C0           0244  7363            ADDL2   #14,R11                 ; point to actual first directory entry
       5C   06     D0           0247  7364            MOVL    #6,R12                  ; do only directory entry
                                024A  7365            $DS_BREAK
00010058 9F   6E   FA           024A                  CALLG   (SP), a#DS$BREAK
     0000213B'EF   16           0251  7366            JSB     CHECK_PACKET            ; go check data packet
                                0257  7367            $DS_BCOMPLETE   8$              ; br =  unknown tape
          03 50   E8            0257                  BLBS    R0, 8$
                                025A  7368            $DS_EXIT        SUB             ; exit subtest if scratch tape
           01E5   31            025A                  BRW     T12_S1_X                ; EXIT SUBTEST 1
                                025D  7369 8$:        $DS_ASKLGCL_S   T_OVERWRITE,B_RESPONSE,,9$,0,
             00   DD            025D                  PUSHL   #0
             00   DD            025F                  PUSHL   #PAR$_NO
             00   DD            0261                  PUSHL   #0
     00000284'EF   DF           0263                  PUSHAL  9$
             00   DD            0269                  PUSHL   #0
     00000012'EF   DF           026B                  PUSHAL  B_RESPONSE
     00001B56'EF   DF           0271                  PUSHAL  T_OVERWRITE
00010098 9F   07   FB           0277                  CALLS   #7, a#DS$ASKLGCL
                                027E  7370            $DS_EXIT        TEST            ; exit test if negative response
          50   01   D0           027E                  MOVL    #1,R0           ; NOT AN ERROR
```

```
                    1EC6   31  0281                        BRW     TEST_012_X      ; EXIT TEST 12
                           0284  7371                                               ; positive response, write directory
          54   FF7E4CE0 8F   D0  0284  7372 9$:     MOVL    #DELAY_TIME7,R4         ; load send packet delay time
          55   00000334'EF   9E  028B  7373         MOVAB   MB_WRITE_1_CMD,R5       ; point to write command packet
               57   0E       D0  0292  7374         MOVL    #14,R7                  ; load transfer byte count
               0000203D'EF   16  0295  7375         JSB     SEND_TU58               ; send command packet
          24 00000000'EF   00   E1  029B  7376         BBC     #V_CLOCK_FLAG,B_FLAGS,20$ ; br = no timeout error
                           02A3  7377         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
               00001BEB'EF   DF  02A3                        PUSHAL  NO_READY
               0000190D'EF   DF  02A9                        PUSHAL  T_WR_REC_ERR
                        00   DD  02AF                        PUSHL   #0
                        04   DD  02B1                        PUSHL   #$ER
                           02B3       ;;; TEST 12, SUBTEST 1, ERROR 4
          000100D0 9F   04   FB  02B3                        CALLS   #$$M, a#DS$ERRHARD
                           02BA  7378         $DS_BNCOMPLETE  10$
                     03 50   E9  02BA                        BLBC    R0, 10$
                           02BD  7379         $DS_ABORT       TEST
                        50   D4  02BD                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                        04   02BF                        RET                     ; TERMINATE TEST
                           02C0  7380 10$:     $DS_ABORT
          00010020 9F   6C   FA  02C0                        CALLG   (AP), a#DS$ABORT
                           02C7  7381                                               ; read continue
          54   FFF3CB00 8F   D0  02C7  7382 20$:     MOVL    #DELAY_TIME3,R4         ; load receive packet delay time
          55   00000000'FF   9E  02CE  7383         MOVAB   a#A_BUFFER_BEGIN,R5     ; load buffer address to store data
          55   00000096 8F   C0  02D5  7384         ADDL2   #150,R5                 ; get above previous data
               57   55   01   C1  02DC  7385         ADDL3   #1,R5,R7                ; load last expected address of data
               000020C8'EF   16  02E0  7386         JSB     MRECEIVE_TU58           ; go get data from TU58
     5A   00000023'EF   9E  02E6  7387         MOVAB   B_CONTINUE,R10          ; load address of expected data
     5B   00000000'FF   9E  02ED  7388         MOVAB   a#A_BUFFER_BEGIN,R11    ; load address of buffer
     5B   00000096 8F   C0  02F4  7389         ADDL    #150,R11                ; point to address of actual data
               57   55   D1  02FB  7390         CMPL    R5,R7                   ; check for correct number of bytes
                        2A   13  02FE  7391         BEQL    60$                     ; br = correct number of bytes
                           0300  7392 25$:     $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                           0300  7393                         P1=#T_REC_CONT
               00001D47'8F   DD  0300                        PUSHL   #T_REC_CONT
               00001EB4'EF   DF  0306                        PUSHAL  REC_ERR
               0000190D'EF   DF  030C                        PUSHAL  T_WR_REC_ERR
                        00   DD  0312                        PUSHL   #0
                        05   DD  0314                        PUSHL   #$ER
                           0316       ;;; TEST 12, SUBTEST 1, ERROR 5
          000100D0 9F   05   FB  0316                        CALLS   #$$M, a#DS$ERRHARD
                           031D  7394         $DS_BNCOMPLETE  30$
                     03 50   E9  031D                        BLBC    R0, 30$
                           0320  7395         $DS_ABORT       TEST
                        50   D4  0320                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                        04   0322                        RET                     ; TERMINATE TEST
                           0323  7396
                           0323  7397 30$:     $DS_ABORT
          00010020 9F   6C   FA  0323                        CALLG   (AP), a#DS$ABORT
                           032A  7398                                               ; check continue packet
                     5C   01   D0  032A  7399 60$:     MOVL    #1,R12                  ; load number of bytes to check
                           032D  7400         $DS_BREAK
          00010058 9F   6E   FA  032D                        CALLG   (SP), a#DS$BREAK
               0000213B'EF   16  0334  7401         JSB     CHECK_PACKET            ; go check continue
                           033A  7402         $DS_BNCOMPLETE  75$                     ; br = no error
```

```
                24 50   E9  033A                        BLBC    R0, 75$
                            033D  7403          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_DATA
          00001E75'EF   DF  033D                        PUSHAL  DATA_ERR_DATA
          0000190D'EF   DF  0343                        PUSHAL  T_WR_REC_ERR
                   00   DD  0349                        PUSHL   #0
                   06   DD  034B                        PUSHL   #$ER
                            034D        ;;; TEST 12, SUBTEST 1, ERROR 6
     000100D0 9F   04   FB  034D                        CALLS   #$$M, @#DS$ERRHARD
                            0354  7404          $DS_BNCOMPLETE  70$                 ; br = error, but continue
                03 50   E9  0354                        BLBC    R0, 70$
                            0357  7405          $DS_ABORT       TEST
                   50   D4  0357                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                        04  0359                        RET                         ; TERMINATE TEST
                            035A  7406 70$:     $DS_ABORT
     00010020 9F   6C   FA  035A                        CALLG   (AP), @#DS$ABORT
                            0361  7407                                              ; send data packet
     54   FFFB6C20 8F   D0  0361  7408 75$:     MOVL    #DELAY_TIME1,R4             ; load send packet delay time
     55   000006EC'EF   9E  0368  7409          MOVAB   B_DATA_PKT_1,R5             ; point to data packet
             57   1E   D0  036F  7410          MOVL    #30,R7                      ; load transfer byte count
          0000203D'EF   16  0372  7411          JSB     SEND_TU58                   ; send data packet
  24 00000000'EF   00   E1  0378  7412          BBC     #V_CLOCK_FLAG,B_FLAGS,90$ ; br = no timeout error
                            0380  7413          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
          00001BEB'EF   DF  0380                        PUSHAL  NO_READY
          0000190D'EF   DF  0386                        PUSHAL  T_WR_REC_ERR
                   00   DD  038C                        PUSHL   #0
                   07   DD  038E                        PUSHL   #$ER
                            0390        ;;; TEST 12, SUBTEST 1, ERROR 7
     000100D0 9F   04   FB  0390                        CALLS   #$$M, @#DS$ERRHARD
                            0397  7414          $DS_BNCOMPLETE  80$
                03 50   E9  0397                        BLBC    R0, 80$
                            039A  7415          $DS_ABORT       TEST
                   50   D4  039A                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                        04  039C                        RET                         ; TERMINATE TEST
                            039D  7416 80$:     $DS_ABORT
     00010020 9F   6C   FA  039D                        CALLG   (AP), @#DS$ABORT
                            03A4  7417                                              ; read end packet
     54   FF7E4CE0 8F   D0  03A4  7418 90$:     MOVL    #DELAY_TIME7,R4             ; load read packet delay time
     55   00000000'FF   9E  03AB  7419          MOVAB   @A_BUFFER_BEGIN,R5          ; load buffer address to store data
     55   000000A8 8F   C0  03B2  7420          ADDL2   #168,R5                     ; get above existing data
        57   55   0E   C1  03B9  7421          ADDL3   #14,R5,R7                   ; load last expected address of data
          000020C8'EF   16  03BD  7422          JSB     MRECEIVE_TU58               ; go get data from TU58
     5A   0000067C'EF   9E  03C3  7423          MOVAB   MB_END_PACKET_3,R10         ; load address of expected end packet
     5B   00000000'FF   9E  03CA  7424          MOVAB   @A_BUFFER_BEGIN,R11         ; load address of buffer
     5B   000000A8 8F   C0  03D1  7425          ADDL2   #168,R11                    ; load address of actual end packet
             57   55   D1  03D8  7426          CMPL    R5,R7                       ; check for correct number of bytes
                   31   13  03DB  7427          BEQL    130$                        ; br = correct number of bytes
     00000000'EF   08   88  03DD  7428          BISB2   #M_END_FLAG,B_FLAGS         ; set end error flag
                            03E4  7429 95$:     $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                            03E4  7430                          P1=#T_REC_END
          00001D2E'8F   DD  03E4                        PUSHL   #T_REC_END
          00001EB4'EF   DF  03EA                        PUSHAL  REC_ERR
          0000190D'EF   DF  03F0                        PUSHAL  T_WR_REC_ERR
                   00   DD  03F6                        PUSHL   #0
                   08   DD  03F8                        PUSHL   #$ER
                            03FA        ;;; TEST 12, SUBTEST 1, ERROR 8
```

```
000100D0 9F   05   FB  03FA                          CALLS   #$$M, a#DS$ERRHARD
                      0401  7431          $DS_BNCOMPLETE  100$
            03 50   E9  0401                          BLBC    R0, 100$
                      0404  7432          $DS_ABORT       TEST
               50   D4  0404                          CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                    04  0406                          RET                         ; TERMINATE TEST
                      0407  7433
                      0407  7434 100$:    $DS_ABORT
00010020 9F   6C   FA  0407                          CALLG   (AP), a#DS$ABORT
                      040E  7435                                                  ; check end packet
         5C   0E   D0  040E  7436 130$:    MOVL    #14,R12                     ; load number of bytes to check
                      0411  7437          $DS_BREAK
00010058 9F   6E   FA  0411                          CALLG   (SP), a#DS$BREAK
     0000213B'EF   16  0418  7438          JSB     CHECK_PACKET                ; go check end packet
                      041E  7439          $DS_BNCOMPLETE  140$                ; br = no error
            21 50   E9  041E                          BLBC    R0, 140$
                      0421  7440          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_END
     00001E9D'EF   DF  0421                          PUSHAL  DATA_ERR_END
     0000190D'EF   DF  0427                          PUSHAL  T_WR_REC_ERR
               00  DD  042D                          PUSHL   #0
               09  DD  042F                          PUSHL   #$ER
                      0431      ;;; TEST 12, SUBTEST 1, ERROR 9
000100D0 9F   04   FB  0431                          CALLS   #$$M, a#DS$ERRHARD
                      0438  7441          $DS_BCOMPLETE   140$
            07 50   E8  0438                          BLBS    R0, 140$
                      043B  7442          $DS_ABORT
00010020 9F   6C   FA  043B                          CALLG   (AP), a#DS$ABORT
                      0442  7443 140$:
                      0442  7444
                      0442  7445
                      0442  7446
                      0442  7447          $DS_ENDSUB
                      0442        T12_S1_X:
00010038 9F   000000F0'EF   FA  0442                          CALLG   $S$, a#DS$ENDSUB
                      044D  7448
                      044D  7449          $DS_PAGE
```

```
044D                    .SBTTL  SUBTEST 12.2:   WRITE BLOCK
044D  7452 ;+
044D  7453 ; SUBTEST DESCRIPTION:
044D  7454 ;
044D  7455 ;       This subtest sends the TU58 a command packet to write one block
044D  7456 ;       with 512 bytes of data. A continue flag should be returned between
044D  7457 ;       sending each data packet and an end packet is then returned from the
044D  7458 ;       TU58. Four 128-byte data packets are sent to fill one block. All byte
044D  7459 ;       transactions between the host and TU58 are timed. If any timer
044D  7460 ;       times out while expecting a data transfer to occur an error
044D  7461 ;       is reported. The data packets contain alternating bytes of all
044D  7462 ;       ones and all zeroes. The end packet is checked and if any errors
044D  7463 ;       have occured, they are reported.
044D  7464 ;
044D  7465 ;
044D  7466 ; SUBTEST STEPS:
044D  7467 ;
044D  7468 ;       SUBTEST WRITE BLOCK
044D  7469 ;       :  Clear buffer
044D  7470 ;       :  Point to write command packet
044D  7471 ;       :  REPEAT
044D  7472 ;       :  :  Send command packet byte at a time
044D  7473 ;       :  :  Set timer
044D  7474 ;       :  :  IF timer expired AND no response
044D  7475 ;       :  :  :  THEN
044D  7476 ;       :  :  :  Report no response error
044D  7477 ;       :  :  :  Exit test
044D  7478 ;       :  :  ENDIF
044D  7479 ;       :  : UNTIL all bytes sent
044D  7480 ;       :  ENDREPEAT
044D  7481 ;       :  DO for count = 1 to 4
044D  7482 ;       :  :  Wait for continue
044D  7483 ;       :  :  Set timer
044D  7484 ;       :  :  IF timer expired AND no response
044D  7485 ;       :  :  :  THEN
044D  7486 ;       :  :  :  Report no response error
044D  7487 ;       :  :  :  Exit test
044D  7488 ;       :  :  ENDIF
044D  7489 ;       :  :  Point to data packet
044D  7490 ;       :  :  REPEAT
044D  7491 ;       :  :  :  Send data packet byte at a time
044D  7492 ;       :  :  :  Set timer
044D  7493 ;       :  :  :  IF timer expired AND no response
044D  7494 ;       :  :  :  :  THEN
044D  7495 ;       :  :  :  :  Report no response error
044D  7496 ;       :  :  :  :  Exit test
044D  7497 ;       :  :  :  ENDIF
044D  7498 ;       :  :  : UNTIL all bytes sent
044D  7499 ;       :  :  ENDREPEAT
044D  7500 ;       :  ENDDO
044D  7501 ;       :  REPEAT
044D  7502 ;       :  :  Set timer
044D  7503 ;       :  :  IF timer expired AND done set
044D  7504 ;       :  :  :  THEN
044D  7505 ;       :  :  :  :  Read byte
```

```
                                044D  7506 ;       :  : ENDIF
                                044D  7507 ;       :  : UNTIL timer expired AND done clear
                                044D  7508 ;       :  ENDREPEAT
                                044D  7509 ;       :  IF expected byte count NEQ actual byte count
                                044D  7510 ;       :  : THEN
                                044D  7511 ;       :  :  : Report error
                                044D  7512 ;       :  :  : Exit test
                                044D  7513 ;       :  ENDIF
                                044D  7514 ;       :  REPEAT
                                044D  7515 ;       :  : Point to expected end packet
                                044D  7516 ;       :  : IF expected end packet data NEQ received end packet data
                                044D  7517 ;       :  :  : THEN
                                044D  7518 ;       :  :  : Report end packet data error
                                044D  7519 ;       :  : ENDIF
                                044D  7520 ;       :  : UNTIL all data checked
                                044D  7521 ;       :  ENDREPEAT
                                044D  7522 ;       ENDSUBTEST WRITE BLOCK
                                044D  7523 ;
                                044D  7524 ;
                                044D  7525 ;
                                044D  7526 ;.page
                                044D  7527 ;-
                                044D  7528          $DS_BGNSUB
                                044D        T12_S2::
00010030 9F   000000FC'EF   FA  044D                CALLG   $S$, a#DS$BGNSUB
                                0458  7529                                    ; clear buffers
         00000000'EF   94   0458  7530          CLRB    B_FLAGS                ; initialize flags
      58 00000000'FF   9E   045E  7531          MOVAB   @A_BUFFER_BEGIN,R8     ; load buffer starting address
      59 00000400 8F   D0   0465  7532          MOVL    #1024,R9               ; do two pages
         00002134'EF   16   046C  7533          JSB     CLEAR_BUFFER           ; go clear buffers
                                0472  7534                                    ; send write command
      54 FFF3CB00 8F   D0   0472  7535          MOVL    #DELAY_TIME3,R4        ; load send packet delay time
      55 00000342'EF   9E   0479  7536          MOVAB   MB_WRITE_2_CMD,R5      ; point to write command packet
            57    0E   D0   0480  7537          MOVL    #14,R7                 ; load transfer byte count
         0000203D'EF   16   0483  7538          JSB     SEND_TU58              ; send command packet
   24 00000000'EF   00   E1   0489  7539          BBC     #V_CLOCK_FLAG,B_FLAGS,20$ ; br = no timeout error
                                0491  7540          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=NO_READY
         00001BEB'EF   DF   0491                    PUSHAL  NO_READY
         000018C8'EF   DF   0497                    PUSHAL  T_WR_BLK_ERR
                  00   DD   049D                    PUSHL   #0
                  01   DD   049F                    PUSHL   #$ER
                                04A1        ;;; TEST 12, SUBTEST 2, ERROR 1
000100D0 9F       04   FB   04A1                    CALLS   #$$M, a#DS$ERRHARD
                                04A8  7541          $DS_BNCOMPLETE  10$
               03 50   E9   04A8                    BLBC    R0, 10$
                                04AB  7542          $DS_ABORT       TEST
                  50   D4   04AB                    CLRL    R0                 ; SEND A WARNING TO THE SUPERVISOR
                  04   04AD                    RET                            ; TERMINATE TEST
                                04AE  7543 10$:     $DS_ABORT
00010020 9F       6C   FA   04AE                    CALLG   (AP), a#DS$ABORT
                                04B5  7544                                    ; read continue
         00000003'EF   94   04B5  7545 20$:  CLRB    B_COUNT                ; clear counter to send 4 data packets
      54 FFC2F700 8F   D0   04BB  7546 30$:  MOVL    #DELAY_TIME6,R4        ; load receive packet delay time
      55 00000000'FF   9E   04C2  7547       MOVAB   @A_BUFFER_BEGIN,R5     ; load buffer address to store data
         57    55   01   C1   04C9  7548       ADDL3   #1,R5,R7               ; load last expected address of data
```

```
                000020C8'EF   16   04CD  7549          JSB     MRECEIVE_TU58                   ; go get data from TU58
          5A    00000023'EF   9E   04D3  7550          MOVAB   B_CONTINUE,R10                  ; load address of expected data
          5B    00000000'FF   9E   04DA  7551          MOVAB   @A_BUFFER_BEGIN,R11             ; load address of buffer
                    57   55   D1   04E1  7552          CMPL    R5,R7                           ; check for correct number of bytes
                         2A   13   04E4  7553          BEQL    70$                             ; br = correct number of bytes
                                   04E6  7554 35$:     $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=REC_ERR,-
                                   04E6  7555                          P1=#T_REC_CONT
                00001D47'8F        DD   04E6                          PUSHL   #T_REC_CONT
                00001EB4'EF        DF   04EC                          PUSHAL  REC_ERR
                000018C8'EF        DF   04F2                          PUSHAL  T_WR_BLK_ERR
                              00   DD   04F8                          PUSHL   #0
                              02   DD   04FA                          PUSHL   #$ER
                                   04FC          ;;; TEST 12, SUBTEST 2, ERROR 2
          000100D0 9F         05   FB   04FC                          CALLS   #$$M, @#DS$ERRHARD
                                   0503  7556          $DS_BNCOMPLETE  40$
                       03 50   E9   0503                          BLBC    R0, 40$
                                   0506  7557          $DS_ABORT       TEST
                              50   D4   0506                          CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                              04   0508                          RET                             ; TERMINATE TEST
                                   0509  7558
                                   0509  7559 40$:     $DS_ABORT
          00010020 9F         6C   FA   0509                          CALLG   (AP), @#DS$ABORT
                                   0510  7560                                                  ; check continue
                         5C   01   D0   0510  7561 70$:     MOVL    #1,R12                      ; load number of bytes to check
                                   0513  7562          $DS_BREAK
          00010058 9F         6E   FA   0513                          CALLG   (SP), @#DS$BREAK
                0000213B'EF        16   051A  7563          JSB     CHECK_PACKET                ; go check continue
                                   0520  7564          $DS_BNCOMPLETE  90$                     ; br = no error
                       24 50   E9   0520                          BLBC    R0, 90$
                                   0523  7565          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=DATA_ERR_CONT
                00001E4D'EF        DF   0523                          PUSHAL  DATA_ERR_CONT
                000018C8'EF        DF   0529                          PUSHAL  T_WR_BLK_ERR
                              00   DD   052F                          PUSHL   #0
                              03   DD   0531                          PUSHL   #$ER
                                   0533          ;;; TEST 12, SUBTEST 2, ERROR 3
          000100D0 9F         04   FB   0533                          CALLS   #$$M, @#DS$ERRHARD
                                   053A  7566          $DS_BNCOMPLETE  80$
                       03 50   E9   053A                          BLBC    R0, 80$
                                   053D  7567          $DS_ABORT       TEST
                              50   D4   053D                          CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                              04   053F                          RET                             ; TERMINATE TEST
                                   0540  7568 80$:     $DS_ABORT
          00010020 9F         6C   FA   0540                          CALLG   (AP), @#DS$ABORT
                                   0547  7569                                                  ; send data packet
          54    FFFB6C20 8F         D0   0547  7570 90$:     MOVL    #DELAY_TIME1,R4             ; load send packet delay time
          55    0000070A'EF         9E   054E  7571          MOVAB   B_DATA_PKT_2,R5             ; point to data packet
          57    00000084 8F         D0   0555  7572          MOVL    #132,R7                     ; load transfer byte count
                0000203D'EF        16   055C  7573          JSB     SEND_TU58                   ; send data packet
       24 00000000'EF         00   E1   0562  7574          BBC     #V_CLOCK_FLAG,B_FLAGS,110$ ; br = no timeout error
                                   056A  7575          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=NO_READY
                00001BEB'EF        DF   056A                          PUSHAL  NO_READY
                000018C8'EF        DF   0570                          PUSHAL  T_WR_BLK_ERR
                              00   DD   0576                          PUSHL   #0
                              04   DD   0578                          PUSHL   #$ER
                                   057A          ;;; TEST 12, SUBTEST 2, ERROR 4
```

```
000100D0 9F   04   FB  057A                        CALLS   #$$M, a#DS$ERRHARD
                  0581  7576          $DS_BNCOMPLETE  100$
          03 50   E9  0581                        BLBC    R0, 100$
                  0584  7577          $DS_ABORT       TEST
             50   D4  0584                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                  04  0586                        RET                         ; TERMINATE TEST
                  0587  7578 100$:    $DS_ABORT
00010020 9F   6C   FA  0587                        CALLG   (AP), a#DS$ABORT
                  058E  7579
     00000000'FF   94  058E  7580 110$:  CLRB    aA_BUFFER_BEGIN             ; clear buffer location with data
FF1D 00000003'EF   01  03  9D  0594  7581        ACBB    #3,#1,B_COUNT,30$   ; br = not finished
                  059E  7582                                                ; read end packet
     54   FFF3CB00 8F   D0  059E  7583 120$:  MOVL    #DELAY_TIME3,R4         ; load receive packet delay time
     55   00000000'FF   9E  05A5  7584        MOVAB   aA_BUFFER_BEGIN,R5      ; load buffer address to store data
        57   55   0E   C1  05AC  7585        ADDL3   #14,R5,R7               ; load last expected address of data
     000020C8'EF   16  05B0  7586        JSB     MRECEIVE_TU58           ; go get data from TU58
     5A   0000068A'EF   9E  05B6  7587        MOVAB   MB_END_PACKET_4,R10     ; load address of expected end packet
     5B   00000000'FF   9E  05BD  7588        MOVAB   aA_BUFFER_BEGIN,R11     ; load address of actual end packet
          57   55   D1  05C4  7589        CMPL    R5,R7                   ; check for correct number of bytes
               31   13  05C7  7590        BEQL    150$                    ; br = correct number of bytes
00000000'EF   08   88  05C9  7591        BISB2   #M_END_FLAG,B_FLAGS     ; set end error flag
                  05D0  7592 122$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=REC_ERR,-
                  05D0  7593                          P1=#T_REC_END
     00001D2E'8F   DD  05D0                        PUSHL   #T_REC_END
     00001EB4'EF   DF  05D6                        PUSHAL  REC_ERR
     000018C8'EF   DF  05DC                        PUSHAL  T_WR_BLK_ERR
               00   DD  05E2                        PUSHL   #0
               05   DD  05E4                        PUSHL   #$ER
                  05E6        ;;; TEST 12, SUBTEST 2, ERROR 5
000100D0 9F   05   FB  05E6                        CALLS   #$$M, a#DS$ERRHARD
                  05ED  7594          $DS_BNCOMPLETE  125$
          03 50   E9  05ED                        BLBC    R0, 125$
                  05F0  7595          $DS_ABORT       TEST
             50   D4  05F0                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                  04  05F2                        RET                         ; TERMINATE TEST
                  05F3  7596
                  05F3  7597 125$:    $DS_ABORT
00010020 9F   6C   FA  05F3                        CALLG   (AP), a#DS$ABORT
                  05FA  7598                                                ; check end packet
          5C   0E   D0  05FA  7599 150$:  MOVL    #14,R12                 ; load number of bytes to check
                  05FD  7600          $DS_BREAK
00010058 9F   6E   FA  05FD                        CALLG   (SP), a#DS$BREAK
     0000213B'EF   16  0604  7601        JSB     CHECK_PACKET            ; go check end packet
                  060A  7602          $DS_BNCOMPLETE  170$                ; br = no error
          24 50   E9  060A                        BLBC    R0, 170$
                  060D  7603          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=DATA_ERR_END
     00001E9D'EF   DF  060D                        PUSHAL  DATA_ERR_END
     000018C8'EF   DF  0613                        PUSHAL  T_WR_BLK_ERR
               00   DD  0619                        PUSHL   #0
               06   DD  061B                        PUSHL   #$ER
                  061D        ;;; TEST 12, SUBTEST 2, ERROR 6
000100D0 9F   04   FB  061D                        CALLS   #$$M, a#DS$ERRHARD
                  0624  7604          $DS_BNCOMPLETE  160$
          03 50   E9  0624                        BLBC    R0, 160$
                  0627  7605          $DS_ABORT       TEST
```

```
                        50   D4  0627                          CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                             04  0629                          RET                     ; TERMINATE TEST
                                 062A  7606 160$:    $DS_ABORT
            00010020 9F      6C  FA  062A                      CALLG   (AP), a#DS$ABORT
                                 0631  7607 170$:
                                 0631  7608          $DS_ENDSUB
                                 0631        T12_S2_X:
    00010038 9F   000000FC'EF    FA  0631                      CALLG   $5$, a#DS$ENDSUB
                                 063C  7609
                                 063C  7610          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 12.3:   READ BLOCK
                ;+
                ; SUBTEST DESCRIPTION:
                ;
                ;       This subtest sends the TU58 a command packet to read the 512
                ;       bytes of data that were written in the previous subtest. A
                ;       timer is set which will time out if there is no response from the
                ;       TU58 between each byte transaction. The end packet and data packets
                ;       are checked for errors. If any errors are encountered they are
                ;       reported.
                ;
                ; SUBTEST STEPS:
                ;
                ;       SUBTEST READ BLOCK
                ;       : Clear buffer
                ;       : Point to read command packet
                ;       : REPEAT
                ;       : : Send command packet byte at a time
                ;       : : Set timer
                ;       : : IF timer expired and no response
                ;       : : : THEN
                ;       : : : Report no response error
                ;       : : : Exit test
                ;       : : ENDIF
                ;       : : UNTIL all bytes sent
                ;       : ENDREPEAT
                ;       : REPEAT
                ;       : : Set timer
                ;       : : IF timer expired AND done set
                ;       : : : THEN
                ;       : : : : Read byte
                ;       : : ENDIF
                ;       : : UNTIL timer expired AND done clear
                ;       : ENDREPEAT
                ;       : IF expected byte count NEQ actual byte count
                ;       : : THEN
                ;       : : : Report error
                ;       : : : Exit test
                ;       : ENDIF
                ;       : REPEAT
                ;       : : Point to expected data packet
                ;       : : REPEAT
                ;       : : : IF data expected NEQ data received
                ;       : : : : THEN
                ;       : : : : Report data error
                ;       : : : : Exit subtest
                ;       : : : ENDIF
                ;       : : : Point to next byte of data
                ;       : : : UNTIL all data in packet checked
                ;       : : ENDREPEAT
                ;       : : UNTIL 4 data packets checked
                ;       : ENDREPEAT
                ;       : Point to expected end packet
                ;       : REPEAT
```

```
                        063C  7667 ;       :  :  IF data expected NEQ data received
                        063C  7668 ;       :  :  :  THEN
                        063C  7669 ;       :  :  :  Report data error
                        063C  7670 ;       :  :  :  Exit subtest
                        063C  7671 ;       :  :  ENDIF
                        063C  7672 ;       :  : UNTIL all end packet bytes checked
                        063C  7673 ;       :  ENDREPEAT
                        063C  7674 ;       ENDSUBTEST READ BLOCK
                        063C  7675 ;
                        063C  7676 ;
                        063C  7677 ;
                        063C  7678 ;.page
                        063C  7679 ;-
                        063C  7680
                        063C  7681          $DS_BGNSUB
                        063C        T12_S3::
00010030 9F   00000108'EF   FA  063C                    CALLG   $S$, a#DS$BGNSUB
                        0647  7682                                      ; clear buffers
         00000000'EF    94  0647  7683          CLRB    B_FLAGS         ; initialize flags
      58 00000000'FF    9E  064D  7684          MOVAB   aA_BUFFER_BEGIN,R8      ; load buffer starting address
      59 00000400 8F    D0  0654  7685          MOVL    #1024,R9        ; do two pages
         00002134'EF    16  065B  7686          JSB     CLEAR_BUFFER    ; go clear buffers
                        0661  7687                                      ; send read command
      54 FFF3CB00 8F    D0  0661  7688          MOVL    #DELAY_TIME3,R4 ; load send packet delay time
      55 00000350'EF    9E  0668  7689          MOVAB   MB_READ_2_CMD,R5        ; point to read command packet
             57   0E    D0  066F  7690          MOVL    #14,R7          ; load transfer byte count
         0000203D'EF    16  0672  7691          JSB     SEND_TU58       ; send command packet
   24 00000000'EF   00    E1  0678  7692          BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                        0680  7693          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=NO_READY
         00001BEB'EF    DF  0680                    PUSHAL  NO_READY
         000018EB'EF    DF  0686                    PUSHAL  T_RD_BLK_ERR
                  00    DD  068C                    PUSHL   #0
                  01    DD  068E                    PUSHL   #$ER
                        0690        ;;; TEST 12, SUBTEST 3, ERROR 1
00010000 9F   04    FB  0690                    CALLS   #$$M, a#DS$ERRHARD
                        0697  7694          $DS_BNCOMPLETE  1$
               03 50    E9  0697                    BLBC    R0, 1$
                        069A  7695          $DS_ABORT       TEST
                  50    D4  069A                    CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                  04    069C                        RET                     ; TERMINATE TEST
                        069D  7696 1$:      $DS_ABORT
00010020 9F   6C    FA  069D                    CALLG   (AP), a#DS$ABORT
                        06A4  7697                                      ; read data and end packets
   54   FFF3CB00 8F    D0  06A4  7698 2$:      MOVL    #DELAY_TIME3,R4 ; load receive packet delay time
   55   00000000'FF    9E  06AB  7699          MOVAB   aA_BUFFER_BEGIN,R5      ; load buffer address to store data
57 55   0000021E 8F    C1  06B2  7700          ADDL3   #542,R5,R7      ; load last expected address of data
        000020C8'EF    16  06BA  7701          JSB     MRECEIVE_TU58   ; go get data from TU58
   5B   00000000'FF    9E  06C0  7702          MOVAB   aA_BUFFER_BEGIN,R11     ; load address of buffer
   5A   0000070A'EF    9E  06C7  7703          MOVAB   B_DATA_PKT_2,R10        ; load address of expected data
             57   55    D1  06CE  7704          CMPL    R5,R7           ; check for correct number of bytes
                  31    13  06D1  7705          BEQL    6$              ; br = correct number of bytes
00000000'EF   04    88  06D3  7706          BISB2   #M_DATA_FLAG,B_FLAGS    ; set data error flag
                        06DA  7707 3$:      $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=REC_ERR,-
                        06DA  7708                      P1=#T_REC_DATA
         00001D68'8F    DD  06DA                    PUSHL   #T_REC_DATA
```

```
                00001EB4'EF   DF  06E0                      PUSHAL  REC_ERR
                000018EB'EF   DF  06E6                      PUSHAL  T_RD_BLK_ERR
                          00  DD  06EC                      PUSHL   #0
                          02  DD  06EE                      PUSHL   #$ER
                              06F0          ;;; TEST 12, SUBTEST 3, ERROR 2
              000100D0 9F     05  FB  06F0                  CALLS   #$$M, a#DS$ERRHARD
                              06F7  7709          $DS_BNCOMPLETE  4$
                       03 50  E9  06F7                      BLBC    R0, 4$
                              06FA  7710          $DS_ABORT       TEST
                          50  D4  06FA                      CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                          04  06FC                      RET                         ; TERMINATE TEST
                              06FD  7711
                              06FD  7712 4$:      $DS_ABORT
              00010020 9F     6C  FA  06FD                  CALLG   (AP), a#DS$ABORT
                              0704  7713                                              ; check data packets
                00000006'EF   D4  0704  7714 6$:      CLRL    L_COUNT                 ; clear counter to check 4 packets
           5C   00000084 8F     D0  070A  7715          MOVL    #132,R12                ; load number of bytes to check
                              0711  7716 7$:      $DS_BREAK
              00010058 9F     6E  FA  0711                  CALLG   (SP), a#DS$BREAK
                0000213B'EF   16  0718  7717          JSB     CHECK_PACKET            ; go check data packet
                              071E  7718          $DS_BNCOMPLETE  9$                  ; br = no error
                       24 50  E9  071E                      BLBC    R0, 9$
                              0721  7719          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=DATA_ERR_DATA
                00001E75'EF   DF  0721                      PUSHAL  DATA_ERR_DATA
                000018EB'EF   DF  0727                      PUSHAL  T_RD_BLK_ERR
                          00  DD  072D                      PUSHL   #0
                          03  DD  072F                      PUSHL   #$ER
                              0731          ;;; TEST 12, SUBTEST 3, ERROR 3
              000100D0 9F     04  FB  0731                  CALLS   #$$M, a#DS$ERRHARD
                              0738  7720          $DS_BNCOMPLETE  8$
                       03 50  E9  0738                      BLBC    R0, 8$
                              073B  7721          $DS_ABORT       TEST
                          50  D4  073B                      CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                          04  073D                      RET                         ; TERMINATE TEST
                              073E  7722 8$:      $DS_ABORT
              00010020 9F     6C  FA  073E                  CALLG   (AP), a#DS$ABORT
           5B   00000084 8F     C0  0745  7723 9$:      ADDL2   #132,R11                ; adjust pointer to next packet
        BD 00000006'EF   03     F3  074C  7724          AOBLEQ  #3,L_COUNT,7$           ; br = not finished checking data
                              0754  7725                                              ; check end packet
           5A   0000068A'EF     9E  0754  7726          MOVAB   MB_END_PACKET_4,R10     ; load address of expected end packet
                     5C   0E     D0  075B  7727          MOVL    #14,R12                 ; load number of bytes to check
                              075E  7728          $DS_BREAK
              00010058 9F     6E  FA  075E                  CALLG   (SP), a#DS$BREAK
                0000213B'EF   16  0765  7729          JSB     CHECK_PACKET            ; go check end packet
                              076B  7730          $DS_BNCOMPLETE  11$                 ; br = no error
                       24 50  E9  076B                      BLBC    R0, 11$
                              076E  7731          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=DATA_ERR_END
                00001E9D'EF   DF  076E                      PUSHAL  DATA_ERR_END
                000018EB'EF   DF  0774                      PUSHAL  T_RD_BLK_ERR
                          00  DD  077A                      PUSHL   #0
                          04  DD  077C                      PUSHL   #$ER
                              077E          ;;; TEST 12, SUBTEST 3, ERROR 4
              000100D0 9F     04  FB  077E                  CALLS   #$$M, a#DS$ERRHARD
                              0785  7732          $DS_BCOMPLETE   10$
                       03 50  E8  0785                      BLBS    R0, 10$
```

```
                                  0788  7733          $DS_ABORT       TEST
                        50   D4   0788                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                             04   078A                        RET                     ; TERMINATE TEST
                                  078B  7734 10$:     $DS_ABORT
          00010020 9F   6C   FA   078B                        CALLG   (AP), a#DS$ABORT
                                  0792  7735 11$:
                                  0792  7736
                                  0792  7737          $DS_ENDSUB
                                  0792        T12_S3_X:
   00010038 9F   00000108'EF   FA 0792                        CALLG   $S$, a#DS$ENDSUB
                                  079D  7738
                                  079D  7739          $DS_PAGE
```

```
079D                    .SBTTL  SUBTEST 12.4:   WRITE MODIFIED
079D  7742 ;+
079D  7743 ; SUBTEST DESCRIPTION:
079D  7744 ;
079D  7745 ;       This subtest sends the TU58 a command packet to write modified
079D  7746 ;       512 bytes of data. A timer is set which will time out if a
079D  7747 ;       response is not received within the allotted time on all byte
079D  7748 ;       transactions between the host and TU58. Four 128 byte data packets
079D  7749 ;       are sent. Before each data packet is sent a continue is read from the
079D  7750 ;       TU58 and when all data has been sent the end packet is read from the
079D  7751 ;       TU58 and checked. If any errors are encountered they are reported.
079D  7752 ;       This modified command will write all of the data and then back up and
079D  7753 ;       check the checksum for data just written.
079D  7754 ;
079D  7755 ;
079D  7756 ; SUBTEST STEPS:
079D  7757 ;
079D  7758 ;       SUBTEST WRITE MODIFIED
079D  7759 ;       :  Clear buffer
079D  7760 ;       :  Point to write command packet
079D  7761 ;       :  REPEAT
079D  7762 ;       :  :  Send command packet byte at a time
079D  7763 ;       :  :  Set timer
079D  7764 ;       :  :  IF timer expired AND no response
079D  7765 ;       :  :  :  THEN
079D  7766 ;       :  :  :  Report no response error
079D  7767 ;       :  :  :  Exit test
079D  7768 ;       :  :  ENDIF
079D  7769 ;       :  : UNTIL all bytes sent
079D  7770 ;       :  ENDREPEAT
079D  7771 ;       :  DO for count = 1 to 4
079D  7772 ;       :  :  Wait for continue
079D  7773 ;       :  :  Set timer
079D  7774 ;       :  :  IF timer expired AND no continue
079D  7775 ;       :  :  :  THEN
079D  7776 ;       :  :  :  Report no continue error
079D  7777 ;       :  :  :  Exit test
079D  7778 ;       :  :  ENDIF
079D  7779 ;       :  :  Point to data packet
079D  7780 ;       :  :  REPEAT
079D  7781 ;       :  :  :  Send data packet byte at a time
079D  7782 ;       :  :  :  Set timer
079D  7783 ;       :  :  :  IF timer expired AND no response
079D  7784 ;       :  :  :  :  THEN
079D  7785 ;       :  :  :  :  Report no response error
079D  7786 ;       :  :  :  :  Exit test
079D  7787 ;       :  :  :  ENDIF
079D  7788 ;       :  :  : UNTIL all bytes sent
079D  7789 ;       :  :  ENDREPEAT
079D  7790 ;       :  ENDDO
079D  7791 ;       :  REPEAT
079D  7792 ;       :  :  Set timer
079D  7793 ;       :  :  IF timer expired AND done set
079D  7794 ;       :  :  :  THEN
079D  7795 ;       :  :  :  :  Read byte
```

```
                                079D  7796 ;       :  : ENDIF
                                079D  7797 ;       :  : UNTIL timer expired AND done clear
                                079D  7798 ;       :  ENDREPEAT
                                079D  7799 ;       :  IF expected byte count NEQ actual byte count
                                079D  7800 ;       :  : THEN
                                079D  7801 ;       :  : : Report error
                                079D  7802 ;       :  : : Exit test
                                079D  7803 ;       :  ENDIF
                                079D  7804 ;       :  Point to expected end packet
                                079D  7805 ;       :  REPEAT
                                079D  7806 ;       :  : IF expected end packet data NEQ received end packet data
                                079D  7807 ;       :  : : THEN
                                079D  7808 ;       :  : : Report end packet data error
                                079D  7809 ;       :  : ENDIF
                                079D  7810 ;       :  : UNTIL all data checked
                                079D  7811 ;       :  ENDREPEAT
                                079D  7812 ;       ENDSUBTEST WRITE MODIFIED
                                079D  7813 ;
                                079D  7814 ;
                                079D  7815 ;.page
                                079D  7816 ;-
                                079D  7817          $DS_BGNSUB
                                079D       T12_S4::
00010030 9F   00000114'EF   FA  079D                CALLG   $S$, a#DS$BGNSUB
                                07A8  7818                                          ; clear buffers
         00000000'EF   94   07A8  7819          CLRB    B_FLAGS                     ; initialize flags
      58 00000000'FF   9E   07AE  7820          MOVAB   aA_BUFFER_BEGIN,R8          ; load buffer starting address
      59 00000400 8F   D0   07B5  7821          MOVL    #1024,R9                    ; do two pages
         00002134'EF   16   07BC  7822          JSB     CLEAR_BUFFER                ; go clear buffers
                       07C2  7823                                                   ; send write command
      54 FFF3CB00 8F   D0   07C2  7824          MOVL    #DELAY_TIME3,R4             ; load send packet delay time
      55 0000037A'EF   9E   07C9  7825          MOVAB   MB_WRITE_4_CMD,R5           ; point to write command packet
             57   0E   D0   07D0  7826          MOVL    #14,R7                      ; load transfer byte count
         0000203D'EF   16   07D3  7827          JSB     SEND_TU58                   ; send command packet
24 00000000'EF   00   E1   07D9  7828          BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                       07E1  7829          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_MOD_ERR,PRLINK=NO_READY
         00001BEB'EF   DF   07E1                        PUSHAL  NO_READY
         00001954'EF   DF   07E7                        PUSHAL  T_WR_MOD_ERR
                  00   DD   07ED                        PUSHL   #0
                  01   DD   07EF                        PUSHL   #$ER
                       07F1       ::: TEST 12, SUBTEST 4, ERROR 1
000100D0 9F   04   FB   07F1                        CALLS   #$$M, a#DS$ERRHARD
                       07F8  7830          $DS_BNCOMPLETE  1$
            03 50   E9   07F8                        BLBC    R0, 1$
                       07FB  7831          $DS_ABORT       TEST
                  50   D4   07FB                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                  04   07FD                        RET                         ; TERMINATE TEST
                       07FE  7832 1$:      $DS_ABORT
00010020 9F   6C   FA   07FE                        CALLG   (AP), a#DS$ABORT
                       0805  7833                                                   ; read continue
         00000003'EF   94   0805  7834 2$:      CLRB    B_COUNT                     ; clear counter to send 4 data packets
      54 FFF3CB00 8F   D0   080B  7835 3$:      MOVL    #DELAY_TIME3,R4             ; load receive packet delay time
      55 00000000'FF   9E   0812  7836          MOVAB   aA_BUFFER_BEGIN,R5          ; load buffer address to store data
         57   55   01   C1   0819  7837          ADDL3   #1,R5,R7                    ; load last expected address of data
         000020C8'EF   16   081D  7838          JSB     MRECEIVE_TU58               ; go get data from TU58
```

```
                5A   00000023'EF   9E   0823  7839          MOVAB   B_CONTINUE,R10              ; load address of expected data
                5B   00000000'FF   9E   082A  7840          MOVAB   @A_BUFFER_BEGIN,R11        ; load address of actual data
                        57   55    D1   0831  7841          CMPL    R5,R7                      ; check for correct number of byte
                             2A    13   0834  7842          BEQL    7$                         ; br = correct number of bytes
                                         0836  7843 4$:      $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_MOD_ERR,PRLINK=REC_ERR,-
                                         0836  7844                          P1=#T_REC_CONT
                           00001D47'8F   DD   0836                          PUSHL   #T_REC_CONT
                           00001EB4'EF   DF   083C                          PUSHAL  REC_ERR
                           00001954'EF   DF   0842                          PUSHAL  T_WR_MOD_ERR
                                    00   DD   0848                          PUSHL   #0
                                    02   DD   084A                          PUSHL   #$ER
                                         084C       ;;; TEST 12, SUBTEST 4, ERROR 2
                000100D0 9F         05   FB   084C                          CALLS   #$$M, @#DS$ERRHARD
                                         0853  7845          $DS_BNCOMPLETE  5$
                              03 50   E9   0853                          BLBC    R0, 5$
                                         0856  7846          $DS_ABORT       TEST
                                    50   D4   0856                          CLRL    R0                 ; SEND A WARNING TO THE SUPERVISOR
                                         0858                               RET                        ; TERMINATE TEST
                                         0859  7847
                                         0859  7848 5$:      $DS_ABORT
                00010020 9F         6C   FA   0859                          CALLG   (AP), @#DS$ABORT
                                         0860  7849                                                     ; check continue
                                 5C  01   D0   0860  7850 7$:      MOVL    #1,R12                     ; load number of bytes to check
                                         0863  7851          $DS_BREAK
                00010058 9F         6E   FA   0863                          CALLG   (SP), @#DS$BREAK
                     0000213B'EF         16   086A  7852          JSB     CHECK_PACKET               ; go check continue
                                         0870  7853          $DS_BNCOMPLETE  9$                         ; br = no error
                                   24 50   E9   0870                          BLBC    R0, 9$
                                         0873  7854          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_MOD_ERR,PRLINK=DATA_ERR_CONT
                           00001E4D'EF   DF   0873                          PUSHAL  DATA_ERR_CONT
                           00001954'EF   DF   0879                          PUSHAL  T_WR_MOD_ERR
                                    00   DD   087F                          PUSHL   #0
                                    03   DD   0881                          PUSHL   #$ER
                                         0883       ;;; TEST 12, SUBTEST 4, ERROR 3
                000100D0 9F         04   FB   0883                          CALLS   #$$M, @#DS$ERRHARD
                                         088A  7855          $DS_BNCOMPLETE  8$
                              03 50   E9   088A                          BLBC    R0, 8$
                                         088D  7856          $DS_ABORT       TEST
                                    50   D4   088D                          CLRL    R0                 ; SEND A WARNING TO THE SUPERVISOR
                                         088F                               RET                        ; TERMINATE TEST
                                         0890  7857 8$:      $DS_ABORT
                00010020 9F         6C   FA   0890                          CALLG   (AP), @#DS$ABORT
                                         0897  7858                                                     ; send data packet
                54   FFFB6C20 8F         D0   0897  7859 9$:      MOVL    #DELAY_TIME1,R4            ; load send packet delay time
                55   0000070A'EF         9E   089E  7860          MOVAB   B_DATA_PKT_2,R5            ; point to data packet
                57   00000084 8F         D0   08A5  7861          MOVL    #132,R7                    ; load transfer byte count
                     0000203D'EF         16   08AC  7862          JSB     SEND_TU58                  ; send data packet
             24 00000000'EF   00         E1   08B2  7863          BBC     #V_CLOCK_FLAG,B_FLAGS,11$  ; br = no timeout error
                                         08BA  7864          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_MOD_ERR,PRLINK=NO_READY
                           00001BEB'EF   DF   08BA                          PUSHAL  NO_READY
                           00001954'EF   DF   08C0                          PUSHAL  T_WR_MOD_ERR
                                    00   DD   08C6                          PUSHL   #0
                                    04   DD   08C8                          PUSHL   #$ER
                                         08CA       ;;; TEST 12, SUBTEST 4, ERROR 4
                000100D0 9F         04   FB   08CA                          CALLS   #$$M, @#DS$ERRHARD
```

```
                                08D1  7865          $DS_BNCOMPLETE  10$
                     03 50   E9 08D1                BLBC    R0, 10$
                                08D4  7866          $DS_ABORT       TEST
                        50   D4 08D4                CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                             04 08D6                RET                     ; TERMINATE TEST
                                08D7  7867 10$:     $DS_ABORT
            00010020 9F   6C   FA 08D7                CALLG   (AP), a#DS$ABORT
                 00000000'FF   94 08DE  7868 11$:     CLRB    aA_BUFFER_BEGIN         ; clear buffer location used for data
    FF1D 00000003'EF   01   03   9D 08E4  7869          ACBB    #3,#1,B_COUNT,3$        ; br = not finished
                                08EE  7870                                          ; read end packet
            54   FFE17B80 8F   D0 08EE  7871          MOVL    #DELAY_TIME5,R4         ; load receive packet delay time
            55   00000000'FF   9E 08F5  7872          MOVAB   aA_BUFFER_BEGIN,R5      ; load buffer address to store data
                57   55   0E   C1 08FC  7873          ADDL3   #14,R5,R7               ; load last expected address of data
                 000020C8'EF   16 0900  7874          JSB     MRECEIVE_TU58           ; go get data from TU58
            5A   0000068A'EF   9E 0906  7875          MOVAB   MB_END_PACKET_4,R10     ; load address of expected end packet
            5B   00000000'FF   9E 090D  7876          MOVAB   aA_BUFFER_BEGIN,R11     ; load address of actual end packet
                    57   55   D1 0914  7877          CMPL    R5,R7                   ; check for correct number of bytes
                         31   13 0917  7878          BEQL    15$                     ; br = correct number of bytes
            00000000'EF   08   88 0919  7879          BISB2   #M_END_FLAG,B_FLAGS     ; set end error flag
                                0920  7880 12$:     $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_MOD_ERR,PRLINK=REC_ERR,-
                                0920  7881                         P1=#T_REC_END
                 00001D2E'8F   DD 0920                PUSHL   #T_REC_END
                 00001EB4'EF   DF 0926                PUSHAL  REC_ERR
                 00001954'EF   DF 092C                PUSHAL  T_WR_MOD_ERR
                         00   DD 0932                PUSHL   #0
                         05   DD 0934                PUSHL   #$ER
                                0936        ;;; TEST 12, SUBTEST 4, ERROR 5
            000100D0 9F   05   FB 0936                CALLS   #$$M, a#DS$ERRHARD
                                093D  7882          $DS_BNCOMPLETE  13$
                     03 50   E9 093D                BLBC    R0, 13$
                                0940  7883          $DS_ABORT       TEST
                        50   D4 0940                CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                             04 0942                RET                     ; TERMINATE TEST
                                0943  7884
                                0943  7885 13$:     $DS_ABORT
            00010020 9F   6C   FA 0943                CALLG   (AP), a#DS$ABORT
                                094A  7886                                  ; check end packet
                     5C   0E   D0 094A  7887 15$:     MOVL    #14,R12                 ; load number of bytes to check
                                094D  7888          $DS_BREAK
            00010058 9F   6E   FA 094D                CALLG   (SP), a#DS$BREAK
                 0000213B'EF   16 0954  7889          JSB     CHECK_PACKET            ; go check end packet
                                095A  7890          $DS_BNCOMPLETE  17$             ; br = no error
                     24 50   E9 095A                BLBC    R0, 17$
                                095D  7891          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_MOD_ERR,PRLINK=DATA_ERR_END
                 00001E9D'EF   DF 095D                PUSHAL  DATA_ERR_END
                 00001954'EF   DF 0963                PUSHAL  T_WR_MOD_ERR
                         00   DD 0969                PUSHL   #0
                         06   DD 096B                PUSHL   #$ER
                                096D        ;;; TEST 12, SUBTEST 4, ERROR 6
            000100D0 9F   04   FB 096D                CALLS   #$$M, a#DS$ERRHARD
                                0974  7892          $DS_BNCOMPLETE  16$
                     03 50   E9 0974                BLBC    R0, 16$
                                0977  7893          $DS_ABORT       TEST
                        50   D4 0977                CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                             04 0979                RET                     ; TERMINATE TEST
```

```
                                  097A  7894 16$:    $DS_ABORT
          00010020 9F   6C    FA  097A                      CALLG   (AP), a#DS$ABORT
                                  0981  7895 17$:
                                  0981  7896         $DS_ENDSUB
                                  0981       T12_S4_X:
   00010038 9F   00000114'EF   FA  0981                      CALLG   $S$, a#DS$ENDSUB
                                  098C  7897
                                  098C  7898         $DS_PAGE
```

```
                        .SBTTL  SUBTEST 12.5:   READ MODIFIED
098C  7901 ;*
098C  7902 ; SUBTEST DESCRIPTION:
098C  7903 ;
098C  7904 ;       This subtest sends the TU58 a command packet to read modified
098C  7905 ;       the 512 bytes of data written in the previous subtest. This
098C  7906 ;       command will cause the TU58 to read the tape with an
098C  7907 ;       increased threshold. A timer is set which will time out if there
098C  7908 ;       is no response within the allotted time. After reading the first
098C  7909 ;       byte of data, another timer is set which will time out if an end
098C  7910 ;       packet is not received within the allotted time. If any data or
098C  7911 ;       timer errors are encountered, they are reported.
098C  7912 ;
098C  7913 ;
098C  7914 ; SUBTEST STEPS:
098C  7915 ;
098C  7916 ;       SUBTEST READ MODIFIED
098C  7917 ;       :  Clear buffer
098C  7918 ;       :  Point to read command packet
098C  7919 ;       :  REPEAT
098C  7920 ;       :  :  Send command packet byte at a time
098C  7921 ;       :  :  Set timer
098C  7922 ;       :  :  IF timer expired and no response
098C  7923 ;       :  :  :  THEN
098C  7924 ;       :  :  :  Report no response error
098C  7925 ;       :  :  :  Exit test
098C  7926 ;       :  :  ENDIF
098C  7927 ;       :  : UNTIL all bytes sent
098C  7928 ;       :  ENDREPEAT
098C  7929 ;       :  REPEAT
098C  7930 ;       :  :  Set timer
098C  7931 ;       :  :  IF timer expired AND done set
098C  7932 ;       :  :  :  THEN
098C  7933 ;       :  :  :  :  Read byte
098C  7934 ;       :  :  ENDIF
098C  7935 ;       :  : UNTIL timer expired AND done clear
098C  7936 ;       :  ENDREPEAT
098C  7937 ;       :  IF expected byte count NEQ actual byte count
098C  7938 ;       :  :  THEN
098C  7939 ;       :  :  :  Report error
098C  7940 ;       :  :  :  Exit test
098C  7941 ;       :  ENDIF
098C  7942 ;       :  REPEAT
098C  7943 ;       :  :  Point to expected data packet
098C  7944 ;       :  :  REPEAT
098C  7945 ;       :  :  :  IF data expected NEQ data received
098C  7946 ;       :  :  :  :  THEN
098C  7947 ;       :  :  :  :  Report data error
098C  7948 ;       :  :  :  :  Exit subtest
098C  7949 ;       :  :  :  ENDIF
098C  7950 ;       :  :  :  Point to next byte of data
098C  7951 ;       :  :  : UNTIL all data in packet checked
098C  7952 ;       :  :  ENDREPEAT
098C  7953 ;       :  : UNTIL 4 data packets checked
098C  7954 ;       :  ENDREPEAT
```

```
                                098C  7955 ;       : Point to expected end packet
                                098C  7956 ;       : REPEAT
                                098C  7957 ;       : : IF end packet data expected NEQ end packet data received
                                098C  7958 ;       : : : THEN
                                098C  7959 ;       : : : Report end packet data error
                                098C  7960 ;       : : : Exit subtest
                                098C  7961 ;       : : ENDIF
                                098C  7962 ;       : : UNTIL all end packet bytes checked
                                098C  7963 ;       : ENDREPEAT
                                098C  7964 ;       ENDSUBTEST READ MODIFIED
                                098C  7965 ;
                                098C  7966 ;
                                098C  7967 ;
                                098C  7968 ;.page
                                098C  7969 ;-
                                098C  7970         $DS_BGNSUB
                                098C       T12_S5::
00010030 9F   00000120'EF   FA  098C                CALLG   $S$, a#DS$BGNSUB
                                0997  7971                                      ; clear buffers
         00000000'EF   94   0997  7972          CLRB    B_FLAGS                 ; initialize flags
      58 00000000'FF   9E   099D  7973          MOVAB   @A_BUFFER_BEGIN,R8      ; load buffer starting address
      59 00000400 8F   D0   09A4  7974          MOVL    #1024,R9                ; do two pages
         00002134'EF   16   09AB  7975          JSB     CLEAR_BUFFER            ; go clear buffers
                       16   09B1  7976                                      ; send read command
      54 FFF3CB00 8F   D0   09B1  7977          MOVL    #DELAY_TIME3,R4         ; load send packet delay time
      55 00000388'EF   9E   09B8  7978          MOVAB   MB_READ_4_CMD,R5                ; point to read command packet
            57   0E   D0   09BF  7979          MOVL    #14,R7                  ; load transfer byte count
         0000203D'EF   16   09C2  7980          JSB     SEND_TU58               ; send command packet
   24 00000000'EF   00   E1   09C8  7981          BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                         09D0  7982          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_MOD_ERR,PRLINK=NO_READY
         00001BEB'EF   DF   09D0                        PUSHAL  NO_READY
         0000197A'EF   DF   09D6                        PUSHAL  T_RD_MOD_ERR
                  00   DD   09DC                        PUSHL   #0
                  01   DD   09DE                        PUSHL   #$ER
                       09E0       ;;; TEST 12, SUBTEST 5, ERROR 1
000100D0 9F       04   FB   09E0                        CALLS   #$$M, a#DS$ERRHARD
                       09E7  7983          $DS_BNCOMPLETE  1$
               03 50   E9   09E7                        BLBC    R0, 1$
                       09EA  7984          $DS_ABORT       TEST
                  50   D4   09EA                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                  04   09EC                        RET                     ; TERMINATE TEST
                       09ED  7985 1$:      $DS_ABORT
00010020 9F       6C   FA   09ED                        CALLG   (AP), a#DS$ABORT
                       09F4  7986                                      ; read data and end packet
      54 FFF3CB00 8F   D0   09F4  7987 2$:      MOVL    #DELAY_TIME3,R4         ; load receive packet delay time
      55 00000000'FF   9E   09FB  7988          MOVAB   @A_BUFFER_BEGIN,R5      ; load buffer address to store data
57    55 0000021E 8F   C1   0A02  7989          ADDL3   #542,R5,R7              ; load last expected address of data
         000020C8'EF   16   0A0A  7990          JSB     MRECEIVE_TU58           ; go get data from TU58
      5B 00000000'FF   9E   0A10  7991          MOVAB   @A_BUFFER_BEGIN,R11     ; load address of actual data
      5A 0000070A'EF   9E   0A17  7992          MOVAB   B_DATA_PKT_2,R10        ; load address of expected data
            57   55   D1   0A1E  7993          CMPL    R5,R7                   ; check for correct number of bytes
                  31   13   0A21  7994          BEQL    6$                      ; br = correct number of bytes
00000000'EF       04   88   0A23  7995          BISB2   #M_DATA_FLAG,B_FLAGS    ; set data error flag
                       0A2A  7996 3$:      $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_MOD_ERR,PRLINK=REC_ERR,-
                       0A2A  7997                      P1=#T_REC_DATA
```

```
                00001D68'8F    DD   0A2A                        PUSHL   #T_REC_DATA
                00001EB4'EF    DF   0A30                        PUSHAL  REC_ERR
                0000197A'EF    DF   0A36                        PUSHAL  T_RD_MOD_ERR
                          00   DD   0A3C                        PUSHL   #0
                          02   DD   0A3E                        PUSHL   #$ER
                               0A40        ;;; TEST 12, SUBTEST 5, ERROR 2
              000100D0 9F 05   FB   0A40                        CALLS   #$$M, a#DS$ERRHARD
                               0A47  7998          $DS_BNCOMPLETE  4$
                       03 50   E9   0A47                        BLBC    R0, 4$
                               0A4A  7999          $DS_ABORT       TEST
                          50   D4   0A4A                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                          04   0A4C                        RET                         ; TERMINATE TEST
                               0A4D  8000
                               0A4D  8001 4$:      $DS_ABORT
              00010020 9F 6C   FA   0A4D                        CALLG   (AP), a#DS$ABORT
                               0A54  8002                                             ; check data packets
                00000006'EF    D4   0A54  8003 6$:      CLRL    L_COUNT                ; clear counter to check 4 packets
           5C   00000084 8F    D0   0A5A  8004          MOVL    #132,R12               ; load number of bytes to check
                               0A61  8005 7$:      $DS_BREAK
              00010058 9F 6E   FA   0A61                        CALLG   (SP), a#DS$BREAK
                0000213B'EF    16   0A68  8006          JSB     CHECK_PACKET           ; go check data packet
                               0A6E  8007          $DS_BNCOMPLETE  9$                 ; br = no error
                       24 50   E9   0A6E                        BLBC    R0, 9$
                               0A71  8008          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_MOD_ERR,PRLINK=DATA_ERR_DATA
                00001E75'EF    DF   0A71                        PUSHAL  DATA_ERR_DATA
                0000197A'EF    DF   0A77                        PUSHAL  T_RD_MOD_ERR
                          00   DD   0A7D                        PUSHL   #0
                          03   DD   0A7F                        PUSHL   #$ER
                               0A81        ;;; TEST 12, SUBTEST 5, ERROR 3
              000100D0 9F 04   FB   0A81                        CALLS   #$$M, a#DS$ERRHARD
                               0A88  8009          $DS_BNCOMPLETE  8$
                       03 50   E9   0A88                        BLBC    R0, 8$
                               0A8B  8010          $DS_ABORT       TEST
                          50   D4   0A8B                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                          04   0A8D                        RET                         ; TERMINATE TEST
                               0A8E  8011 8$:      $DS_ABORT
              00010020 9F 6C   FA   0A8E                        CALLG   (AP), a#DS$ABORT
           5B   00000084 8F    C0   0A95  8012 9$:      ADDL2   #132,R11               ; adjust pointer to next packet
        BD 00000006'EF 03      F3   0A9C  8013          AOBLEQ  #3,L_COUNT,7$          ; br = not finished checking data
                               0AA4  8014                                             ; check end packet
           5A   0000068A'EF    9E   0AA4  8015          MOVAB   MB_END_PACKET_4,R10    ; load address of expected end packet
                     5C   0E   D0   0AAB  8016          MOVL    #14,R12                ; load number of bytes to check
                               0AAE  8017          $DS_BREAK
              00010058 9F 6E   FA   0AAE                        CALLG   (SP), a#DS$BREAK
                0000213B'EF    16   0AB5  8018          JSB     CHECK_PACKET           ; go check end packet
                               0ABB  8019          $DS_BNCOMPLETE  11$                ; br = no error
                       24 50   E9   0ABB                        BLBC    R0, 11$
                               0ABE  8020          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_MOD_ERR,PRLINK=DATA_ERR_END
                00001E9D'EF    DF   0ABE                        PUSHAL  DATA_ERR_END
                0000197A'EF    DF   0AC4                        PUSHAL  T_RD_MOD_ERR
                          00   DD   0ACA                        PUSHL   #0
                          04   DD   0ACC                        PUSHL   #$ER
                               0ACE        ;;; TEST 12, SUBTEST 5, ERROR 4
              000100D0 9F 04   FB   0ACE                        CALLS   #$$M, a#DS$ERRHARD
                               0AD5  8021          $DS_BNCOMPLETE  10$
```

```
                    03 50   E9  0AD5                        BLBC    R0, 10$
                                0AD8  8022          $DS_ABORT       TEST
                       50   D4  0AD8                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                            04  0ADA                        RET                     ; TERMINATE TEST
                                0ADB  8023 10$:     $DS_ABORT
          00010020 9F   6C   FA  0ADB                        CALLG   (AP), a#DS$ABORT
                                0AE2  8024 11$:     $DS_ENDSUB
                                0AE2       T12_S5_X:
   00010038 9F   00000120'EF   FA  0AE2                        CALLG   $S$, a#DS$ENDSUB
                                0AED  8025          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 12.6:   WRITE RECORD
0AED  8028 ;+
0AED  8029 ; SUBTEST DESCRIPTION:
0AED  8030 ;
0AED  8031 ;       This subtest sends the TU58 a command packet to write one record
0AED  8032 ;       with 128 bytes of data. A continue flag is returned and the
0AED  8033 ;       data packet is sent. All byte transactions between the host and
0AED  8034 ;       TU58 are timed and will timeout if there is no response within
0AED  8035 ;       the allotted time. If a timer expires while expecting a data
0AED  8036 ;       transfer to occur, an error is reported. The data packet
0AED  8037 ;       contains alternating bytes of all one's and all zero's. Both
0AED  8038 ;       end and data packets are checked and if any errors have occured,
0AED  8039 ;       they are reported.
0AED  8040 ;
0AED  8041 ;
0AED  8042 ; SUBTEST STEPS:
0AED  8043 ;
0AED  8044 ;       SUBTEST WRITE RECORD
0AED  8045 ;       :  Clear buffer
0AED  8046 ;       :  Point to write command packet
0AED  8047 ;       :  REPEAT
0AED  8048 ;       :  :  Send command packet byte at a time
0AED  8049 ;       :  :  Set timer
0AED  8050 ;       :  :  IF timer expired AND no response
0AED  8051 ;       :  :  :  THEN
0AED  8052 ;       :  :  :  Report no response error
0AED  8053 ;       :  :  :  Exit test
0AED  8054 ;       :  :  ENDIF
0AED  8055 ;       :  : UNTIL all bytes sent
0AED  8056 ;       :  ENDREPEAT
0AED  8057 ;       :  Wait for continue
0AED  8058 ;       :  Set timer
0AED  8059 ;       :  IF timer expired AND no continue
0AED  8060 ;       :  :  THEN
0AED  8061 ;       :  :  Report no continue error
0AED  8062 ;       :  :  Exit test
0AED  8063 ;       :  ENDIF
0AED  8064 ;       :  Point to data packet
0AED  8065 ;       :  REPEAT
0AED  8066 ;       :  :  Send data packet byte at a time
0AED  8067 ;       :  :  Set timer
0AED  8068 ;       :  :  IF timer expired AND no response
0AED  8069 ;       :  :  :  THEN
0AED  8070 ;       :  :  :  Report no response error
0AED  8071 ;       :  :  :  Exit test
0AED  8072 ;       :  :  ENDIF
0AED  8073 ;       :  : UNTIL all bytes sent
0AED  8074 ;       :  ENDREPEAT
0AED  8075 ;       :  REPEAT
0AED  8076 ;       :  :  Set timer
0AED  8077 ;       :  :  IF timer expired AND done set
0AED  8078 ;       :  :  :  THEN
0AED  8079 ;       :  :  :  :  Read byte
0AED  8080 ;       :  :  ENDIF
0AED  8081 ;       :  : UNTIL timer expired AND done clear
```

```
                        0AED  8082 ;       :  ENDREPEAT
                        0AED  8083 ;       :  IF expected byte count NEQ actual byte count
                        0AED  8084 ;       :  : THEN
                        0AED  8085 ;       :  :  : Report error
                        0AED  8086 ;       :  :  : Exit test
                        0AED  8087 ;       :  ENDIF
                        0AED  8088 ;       :  REPEAT
                        0AED  8089 ;       :  : Point to expected end packet
                        0AED  8090 ;       :  : IF expected end packet data NEQ received end packet data
                        0AED  8091 ;       :  :  : THEN
                        0AED  8092 ;       :  :  : Report end packet data error
                        0AED  8093 ;       :  : ENDIF
                        0AED  8094 ;       :  : UNTIL all data checked
                        0AED  8095 ;       :  ENDREPEAT
                        0AED  8096 ;       ENDSUBTEST WRITE RECORD
                        0AED  8097 ;
                        0AED  8098 ;
                        0AED  8099 ;
                        0AED  8100 ;.page
                        0AED  8101 ;-
                        0AED  8102
                        0AED  8103          $DS_BGNSUB
                        0AED        T12_S6::
00010030 9F   0000012C'EF   FA  0AED                    CALLG   $S$, a#DS$BGNSUB
              00000000'EF   94  0AF8  8104              CLRB    B_FLAGS                 ; initialize flags
              00000002'EF   94  0AFE  8105              CLRB    B_FLAGS3
                            0B04  8106                                                ; clear buffers
         58   00000000'FF   9E  0B04  8107              MOVAB   aA_BUFFER_BEGIN,R8      ; load buffer starting address
         59   00000400 8F   D0  0B0B  8108              MOVL    #1024,R9                ; do two pages
              00002134'EF   16  0B12  8109              JSB     CLEAR_BUFFER            ; go clear buffers
                            0B18  8110                                                ; send write command
         54   FFE17B80 8F   D0  0B18  8111              MOVL    #DELAY_TIME5,R4         ; load send packet delay time
         55   0000035E'EF   9E  0B1F  8112              MOVAB   MB_WRITE_3_CMD,R5       ; point to write command packet
                 57   0E    D0  0B26  8113              MOVL    #14,R7                  ; load transfer byte count
              0000203D'EF   16  0B29  8114              JSB     SEND_TU58               ; send command packet
   24 00000000'EF   00   E1  0B2F  8115              BBC     #V_CLOCK_FLAG,B_FLAGS,20$ ; br = no timeout error
                            0B37  8116              $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
              00001BEB'EF   DF  0B37                    PUSHAL  NO_READY
              0000190D'EF   DF  0B3D                    PUSHAL  T_WR_REC_ERR
                        00  DD  0B43                    PUSHL   #0
                        01  DD  0B45                    PUSHL   #$ER
                            0B47        ;;; TEST 12, SUBTEST 6, ERROR 1
000100D0 9F   04    FB  0B47                    CALLS   #$$M, a#DS$ERRHARD
                            0B4E  8117          $DS_BNCOMPLETE  10$
                  03 50   E9  0B4E                    BLBC    R0, 10$
                            0B51  8118          $DS_ABORT       TEST
                        50  D4  0B51                    CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                        04  0B53                    RET                             ; TERMINATE TEST
                            0B54  8119 10$:     $DS_ABORT
00010020 9F   6C    FA  0B54                    CALLG   (AP), a#DS$ABORT
                            0B5B  8120                                                ; read continue
         54   FFF3CB00 8F   D0  0B5B  8121 20$:  MOVL    #DELAY_TIME3,R4         ; load receive packet delay time
         55   00000000'FF   9E  0B62  8122           MOVAB   aA_BUFFER_BEGIN,R5      ; load buffer address to store data
            57   55   01    C1  0B69  8123           ADDL3   #1,R5,R7                ; load last expected address of data
              000020C8'EF   16  0B6D  8124           JSB     MRECEIVE_TU58           ; go get data from TU58
```

```
                5A   00000023'EF   9E   0B73  8125          MOVAB   B_CONTINUE,R10           ; load address of expected data
                5B   00000000'FF   9E   0B7A  8126          MOVAB   @A_BUFFER_BEGIN,R11     ; load address of actual data
                     57   55       D1   0B81  8127          CMPL    R5,R7                   ; check for correct number of bytes
                          2A       13   0B84  8128          BEQL    60$                     ; br = correct number of bytes
                                   0B86  8129 25$:     $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                                   0B86  8130                          P1=#T_REC_CONT
                          00001D47'8F   DD   0B86                      PUSHL   #T_REC_CONT
                          00001EB4'EF   DF   0B8C                      PUSHAL  REC_ERR
                          0000190D'EF   DF   0B92                      PUSHAL  T_WR_REC_ERR
                                    00   DD   0B98                      PUSHL   #0
                                    02   DD   0B9A                      PUSHL   #$ER
                                         0B9C       ;;; TEST 12, SUBTEST 6, ERROR 2
                000100D0 9F         05   FB   0B9C                      CALLS   #$$M, @#DS$ERRHARD
                                   0BA3  8131          $DS_BNCOMPLETE  30$
                          03 50    E9   0BA3                      BLBC    R0, 30$
                                   0BA6  8132          $DS_ABORT       TEST
                                    50   D4   0BA6                      CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                                    04   0BA8                      RET                     ; TERMINATE TEST
                                   0BA9  8133
                                   0BA9  8134 30$:     $DS_ABORT
                00010020 9F         6C   FA   0BA9                      CALLG   (AP), @#DS$ABORT
                                   0BB0  8135                          ;check continue
                          5C       01   D0   0BB0  8136 60$:     MOVL    #1,R12                  ; load number of bytes to check
                                   0BB3  8137          $DS_BREAK
                00010058 9F         6E   FA   0BB3                      CALLG   (SP), @#DS$BREAK
                     0000213B'EF    16   0BBA  8138          JSB     CHECK_PACKET            ; go check end packet
                                   0BC0  8139          $DS_BNCOMPLETE  80$                     ; br = no error
                             24 50 E9   0BC0                      BLBC    R0, 80$
                                   0BC3  8140          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_CONT
                          00001E4D'EF   DF   0BC3                      PUSHAL  DATA_ERR_CONT
                          0000190D'EF   DF   0BC9                      PUSHAL  T_WR_REC_ERR
                                    00   DD   0BCF                      PUSHL   #0
                                    03   DD   0BD1                      PUSHL   #$ER
                                         0BD3       ;;; TEST 12, SUBTEST 6, ERROR 3
                000100D0 9F         04   FB   0BD3                      CALLS   #$$M, @#DS$ERRHARD
                                   0BDA  8141          $DS_BNCOMPLETE  70$
                          03 50    E9   0BDA                      BLBC    R0, 70$
                                   0BDD  8142          $DS_ABORT       TEST
                                    50   D4   0BDD                      CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                                    04   0BDF                      RET                     ; TERMINATE TEST
                                   0BE0  8143 70$:     $DS_ABORT
                00010020 9F         6C   FA   0BE0                      CALLG   (AP), @#DS$ABORT
                                   0BE7  8144                          ;send data packet
                54   FFFB6C20 8F    D0   0BE7  8145 80$:     MOVL    #DELAY_TIME1,R4         ; load send packet delay time
                55   0000070A'EF    9E   0BEE  8146          MOVAB   B_DATA_PKT_2,R5         ; point to data packet
                57   00000084 8F    D0   0BF5  8147          MOVL    #132,R7                 ; load transfer byte count
                     0000203D'EF    16   0BFC  8148          JSB     SEND_TU58               ; send data packet
           24 00000000'EF    00    E1   0C02  8149          BBC     #V_CLOCK_FLAG,B_FLAGS,100$ ; br = no timeout error
                                   0C0A  8150          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
                          00001BEB'EF   DF   0C0A                      PUSHAL  NO_READY
                          0000190D'EF   DF   0C10                      PUSHAL  T_WR_REC_ERR
                                    00   DD   0C16                      PUSHL   #0
                                    04   DD   0C18                      PUSHL   #$ER
                                         0C1A       ;;; TEST 12, SUBTEST 6, ERROR 4
                000100D0 9F         04   FB   0C1A                      CALLS   #$$M, @#DS$ERRHARD
```

```
                                0C21  8151          $DS_BNCOMPLETE  90$
                  03 50    E9   0C21                        BLBC    R0, 90$
                                0C24  8152          $DS_ABORT       TEST
                     50    D4   0C24                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                           04   0C26                        RET                         ; TERMINATE TEST
                                0C27  8153 90$:     $DS_ABORT
      00010020 9F    6C    FA   0C27                        CALLG   (AP), a#DS$ABORT
                                0C2E  8154                                              ; read end packet
           00000002'EF    96   0C2E  8155 100$:    INCB    B_FLAGS3                    ; set data done flag
      54   FFC2F700 8F    D0   0C34  8156          MOVL    #DELAY_TIME6,R4             ; load receive packet delay time
      55   00000000'FF    9E   0C3B  8157          MOVAB   @A_BUFFER_BEGIN,R5          ; load address to store actual data
          57    55    0E   C1   0C42  8158          ADDL3   #14,R5,R7                   ; load last expected address of data
           000020C8'EF    16   0C46  8159          JSB     MRECEIVE_TU58               ; go get data from TU58
      5A   00000698'EF    9E   0C4C  8160          MOVAB   MB_END_PACKET_5,R10         ; load address of expected end packet
      5B   00000000'FF    9E   0C53  8161          MOVAB   @A_BUFFER_BEGIN,R11         ; load address of actual end packet
               57    55   D1   0C5A  8162          CMPL    R5,R7                       ; check for correct number of bytes
                     31   13   0C5D  8163          BEQL    140$                        ; br = correct number of bytes
      00000000'EF    08    88   0C5F  8164          BISB2   #M_END_FLAG,B_FLAGS         ; set end error flag
                                0C66  8165 105$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                                0C66  8166                          P1=#T_REC_END
           00001D2E'8F    DD   0C66                        PUSHL   #T_REC_END
           00001EB4'EF    DF   0C6C                        PUSHAL  REC_ERR
           0000190D'EF    DF   0C72                        PUSHAL  T_WR_REC_ERR
                     00   DD   0C78                        PUSHL   #0
                     05   DD   0C7A                        PUSHL   #$ER
                                0C7C          ;;; TEST 12, SUBTEST 6, ERROR 5
      000100D0 9F    05    FB   0C7C                        CALLS   #$$M, a#DS$ERRHARD
                                0C83  8167          $DS_BNCOMPLETE  110$
                  03 50    E9   0C83                        BLBC    R0, 110$
                                0C86  8168          $DS_ABORT       TEST
                     50    D4   0C86                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                           04   0C88                        RET                         ; TERMINATE TEST
                                0C89  8169
                                0C89  8170 110$:    $DS_ABORT
      00010020 9F    6C    FA   0C89                        CALLG   (AP), a#DS$ABORT
                                0C90  8171                                              ; check end packet
               5C    0E   D0   0C90  8172 140$:    MOVL    #14,R12                     ; load number of bytes to check
                                0C93  8173          $DS_BREAK
      00010058 9F    6E    FA   0C93                        CALLG   (SP), a#DS$BREAK
           0000213B'EF    16   0C9A  8174          JSB     CHECK_PACKET                ; go check end packet
                                0CA0  8175          $DS_BNCOMPLETE  160$                ; br = no error
                  24 50    E9   0CA0                        BLBC    R0, 160$
                                0CA3  8176          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_END
           00001E9D'EF    DF   0CA3                        PUSHAL  DATA_ERR_END
           0000190D'EF    DF   0CA9                        PUSHAL  T_WR_REC_ERR
                     00   DD   0CAF                        PUSHL   #0
                     06   DD   0CB1                        PUSHL   #$ER
                                0CB3          ;;; TEST 12, SUBTEST 6, ERROR 6
      000100D0 9F    04    FB   0CB3                        CALLS   #$$M, a#DS$ERRHARD
                                0CBA  8177          $DS_BNCOMPLETE  150$
                  03 50    E9   0CBA                        BLBC    R0, 150$
                                0CBD  8178          $DS_ABORT       TEST
                     50    D4   0CBD                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                           04   0CBF                        RET                         ; TERMINATE TEST
                                0CC0  8179 150$:    $DS_ABORT
```

```
                00010020 9F    6C    FA  0CC0                          CALLG   (AP), a#DS$ABORT
                                   0CC7  8180 160$:
                                   0CC7  8181          $DS_ENDSUB
                                   0CC7        T12_S6_X:
    00010038 9F    0000012C'EF    FA  0CC7                          CALLG   $S$, a#DS$ENDSUB
                                   0CD2  8182
                                   0CD2  8183          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 12.7:   READ RECORD
0CD2   8186 ;+
0CD2   8187 ; SUBTEST DESCRIPTION:
0CD2   8188 ;
0CD2   8189 ;       This subtest sends the TU58 a command packet to read the 128
0CD2   8190 ;       bytes of data that were written in the previous subtest. A
0CD2   8191 ;       timer is set and times out if there is no response between all
0CD2   8192 ;       byte transactions. The end packet and data packet are checked for
0CD2   8193 ;       errors. If any errors are encountered they are reported.
0CD2   8194 ;
0CD2   8195 ;
0CD2   8196 ; SUBTEST STEPS:
0CD2   8197 ;
0CD2   8198 ;       SUBTEST READ RECORD
0CD2   8199 ;       :  Clear buffer
0CD2   8200 ;       :  Point to read command packet
0CD2   8201 ;       :  REPEAT
0CD2   8202 ;       :  :  Send command packet byte at a time
0CD2   8203 ;       :  :  Set timer
0CD2   8204 ;       :  :  IF timer expired and no response
0CD2   8205 ;       :  :  :  THEN
0CD2   8206 ;       :  :  :  Report no response error
0CD2   8207 ;       :  :  :  Exit test
0CD2   8208 ;       :  :  ENDIF
0CD2   8209 ;       :  : UNTIL all bytes sent
0CD2   8210 ;       :  ENDREPEAT
0CD2   8211 ;       :  REPEAT
0CD2   8212 ;       :  :  Set timer
0CD2   8213 ;       :  :  IF timer expired AND done set
0CD2   8214 ;       :  :  :  THEN
0CD2   8215 ;       :  :  :  :  Read byte
0CD2   8216 ;       :  :  ENDIF
0CD2   8217 ;       :  : UNTIL timer expired AND done clear
0CD2   8218 ;       :  ENDREPEAT
0CD2   8219 ;       :  IF expected byte count NEQ actual byte count
0CD2   8220 ;       :  :  THEN
0CD2   8221 ;       :  :  :  Report error
0CD2   8222 ;       :  :  :  Exit test
0CD2   8223 ;       :  ENDIF
0CD2   8224 ;       :  Point to expected data packet
0CD2   8225 ;       :  REPEAT
0CD2   8226 ;       :  :  IF data expected NEQ data received
0CD2   8227 ;       :  :  :  THEN
0CD2   8228 ;       :  :  :  Report data error
0CD2   8229 ;       :  :  :  Exit subtest
0CD2   8230 ;       :  :  ENDIF
0CD2   8231 ;       :  :  Point to next byte of data
0CD2   8232 ;       :  : UNTIL all data in packet checked
0CD2   8233 ;       :  ENDREPEAT
0CD2   8234 ;       :  Point to expected end packet
0CD2   8235 ;       :  REPEAT
0CD2   8236 ;       :  :  IF expected end packet data NEQ received end packet data
0CD2   8237 ;       :  :  :  THEN
0CD2   8238 ;       :  :  :  Report end packet data error
0CD2   8239 ;       :  :  :  Exit subtest
```

```
                                0CD2  8240 ;       :  : ENDIF
                                0CD2  8241 ;       :  : UNTIL all end packet bytes checked
                                0CD2  8242 ;       :  ENDREPEAT
                                0CD2  8243 ;       ENDSUBTEST READ RECORD
                                0CD2  8244 ;
                                0CD2  8245 ;
                                0CD2  8246 ;
                                0CD2  8247 ;.page
                                0CD2  8248 ;-
                                0CD2  8249         $DS_BGNSUB
                                0CD2       T12_S7::
00010030 9F   00000138'EF   FA  0CD2                CALLG   $S$, a#DS$BGNSUB
                                0CDD  8250                                  ; clear buffers
         00000000'EF    94      0CDD  8251         CLRB    B_FLAGS          ; initialize flags
      58 00000000'FF    9E      0CE3  8252         MOVAB   @A_BUFFER_BEGIN,R8  ; load buffer starting address
      59 00000400 8F    D0      0CEA  8253         MOVL    #1024,R9         ; do two pages
         00002134'EF    16      0CF1  8254         JSB     CLEAR_BUFFER     ; go clear buffers
                                0CF7  8255                                  ; send read command
      54 FFF3CB00 8F    D0      0CF7  8256         MOVL    #DELAY_TIME3,R4  ; load send packet delay time
      55 0000036C'EF    9E      0CFE  8257         MOVAB   MB_READ_3_CMD,R5    ; point to read command packet
            57   0E     D0      0D05  8258         MOVL    #14,R7           ; load transfer byte count
         0000203D'EF    16      0D08  8259         JSB     SEND_TU58        ; send command packet
   24 00000000'EF   00  E1      0D0E  8260         BBC     #V_CLOCK_FLAG,B_FLAGS,2$ ; br = no timeout error
                                0D16  8261         $DS_ERRHARD_S    ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=NO_READY
         00001BEB'EF    DF      0D16                PUSHAL  NO_READY
         00001931'EF    DF      0D1C                PUSHAL  T_RD_REC_ERR
                  00    DD      0D22                PUSHL   #0
                  01    DD      0D24                PUSHL   #$ER
                                0D26       ;;; TEST 12, SUBTEST 7, ERROR 1
00010DD0 9F     04    FB      0D26                CALLS   #$$M, a#DS$ERRHARD
                                0D2D  8262         $DS_BNCOMPLETE  1$
            03 50   E9      0D2D                BLBC    R0, 1$
                                0D30  8263         $DS_ABORT       TEST
                  50    D4      0D30                CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                  04    0D32                RET                              ; TERMINATE TEST
                                0D33  8264 1$:     $DS_ABORT
00010020 9F     6C    FA      0D33                CALLG   (AP), a#DS$ABORT
                                0D3A  8265                                  ; read data and end packet
   54   FFF3CB00 8F    D0      0D3A  8266 2$:     MOVL    #DELAY_TIME3,R4  ; load receive packet delay time
   55   00000000'FF    9E      0D41  8267         MOVAB   @A_BUFFER_BEGIN,R5  ; load buffer address to store data
57 55   00000092 8F    C1      0D48  8268         ADDL3   #146,R5,R7       ; load last expected address of data
        000020C8'EF    16      0D50  8269         JSB     MRECEIVE_TU58    ; go get data from TU58
   5B   00000000'FF    9E      0D56  8270         MOVAB   @A_BUFFER_BEGIN,R11 ; load address of actual data
   5A   0000070A'EF    9E      0D5D  8271         MOVAB   B_DATA_PKT_2,R10 ; load address of expected data
           57   55     D1      0D64  8272         CMPL    R5,R7            ; check for correct number of bytes
                31     13      0D67  8273         BEQL    6$               ; br = correct number of bytes
00000000'EF     04    88      0D69  8274         BISB2   #M_DATA_FLAG,B_FLAGS ; set data error flag
                                0D70  8275 3$:     $DS_ERRHARD_S    ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=REC_ERR,-
                                0D70  8276                         P1=#T_REC_DATA
        00001D68'8F     DD      0D70                PUSHL   #T_REC_DATA
        00001EB4'EF     DF      0D76                PUSHAL  REC_ERR
        00001931'EF     DF      0D7C                PUSHAL  T_RD_REC_ERR
                  00    DD      0D82                PUSHL   #0
                  02    DD      0D84                PUSHL   #$ER
                                0D86       ;;; TEST 12, SUBTEST 7, ERROR 2
```

```
000100D0 9F   05   FB  0D86                        CALLS   #$$M, a#DS$ERRHARD
                  0D8D  8277          $DS_BNCOMPLETE  4$
            03 50 E9  0D8D                        BLBC    R0, 4$
                  0D90  8278          $DS_ABORT       TEST
               50 D4  0D90                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                  04  0D92                        RET                         ; TERMINATE TEST
                  0D93  8279
                  0D93  8280 4$:      $DS_ABORT
00010020 9F   6C   FA  0D93                        CALLG   (AP), a#DS$ABORT
                  0D9A  8281                                                  ; check data packet
5C 00000084 8F   D0  0D9A  8282 6$:   MOVL    #132,R12                      ; load number of bytes to check
                  0DA1  8283          $DS_BREAK
00010058 9F   6E   FA  0DA1                        CALLG   (SP), a#DS$BREAK
     0000213B'EF   16  0DA8  8284          JSB     CHECK_PACKET              ; go check data packet
                  0DAE  8285          $DS_BNCOMPLETE  8$                    ; br = no error
            24 50 E9  0DAE                        BLBC    R0, 8$
                  0DB1  8286          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=DATA_ERR_DATA
     00001E75'EF   DF  0DB1                        PUSHAL  DATA_ERR_DATA
     00001931'EF   DF  0DB7                        PUSHAL  T_RD_REC_ERR
               00  DD  0DBD                        PUSHL   #0
               03  DD  0DBF                        PUSHL   #$ER
                  0DC1       ;;; TEST 12, SUBTEST 7, ERROR 3
000100D0 9F   04   FB  0DC1                        CALLS   #$$M, a#DS$ERRHARD
                  0DC8  8287          $DS_BNCOMPLETE  7$
            03 50 E9  0DC8                        BLBC    R0, 7$
                  0DCB  8288          $DS_ABORT       TEST
               50 D4  0DCB                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                  04  0DCD                        RET                         ; TERMINATE TEST
                  0DCE  8289 7$:      $DS_ABORT
00010020 9F   6C   FA  0DCE                        CALLG   (AP), a#DS$ABORT
                  0DD5  8290                                                  ; check end packet
5B 00000084 8F   C0  0DD5  8291 8$:   ADDL2   #132,R11                      ; adjust pointer to next packet
5A 00000698'EF   9E  0DDC  8292       MOVAB   MB_END_PACKET_5,R10           ; load address of expected end packet
         5C   0E   D0  0DE3  8293       MOVL    #14,R12                     ; load number of bytes to check
                  0DE6  8294          $DS_BREAK
00010058 9F   6E   FA  0DE6                        CALLG   (SP), a#DS$BREAK
     0000213B'EF   16  0DED  8295          JSB     CHECK_PACKET              ; go check end packet
                  0DF3  8296          $DS_BNCOMPLETE  10$                   ; br = no error
            24 50 E9  0DF3                        BLBC    R0, 10$
                  0DF6  8297          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=DATA_ERR_END
     00001E9D'EF   DF  0DF6                        PUSHAL  DATA_ERR_END
     00001931'EF   DF  0DFC                        PUSHAL  T_RD_REC_ERR
               00  DD  0E02                        PUSHL   #0
               04  DD  0E04                        PUSHL   #$ER
                  0E06       ;;; TEST 12, SUBTEST 7, ERROR 4
000100D0 9F   04   FB  0E06                        CALLS   #$$M, a#DS$ERRHARD
                  0E0D  8298          $DS_BNCOMPLETE  9$                    ; br = error, but continue
            03 50 E9  0E0D                        BLBC    R0, 9$
                  0E10  8299          $DS_ABORT       TEST
               50 D4  0E10                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                  04  0E12                        RET                         ; TERMINATE TEST
                  0E13  8300 9$:      $DS_ABORT
00010020 9F   6C   FA  0E13                        CALLG   (AP), a#DS$ABORT
                  0E1A  8301 10$:
                  0E1A  8302          $DS_ENDSUB
```

```
                        0E1A        T12_S7_X:
00010038 9F   00000138'EF   FA  0E1A                    CALLG   $S$, a#DS$ENDSUB
                            0E25  8303
                            0E25  8304          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 12.8:   WRITE BLOCK - PADDED ZEROS
0E25  8307 ;+
0E25  8308 ; SUBTEST DESCRIPTION:
0E25  8309 ;
0E25  8310 ;       This subtest sends the TU58 a series of command packets to check
0E25  8311 ;       that a block written with less than 512 bytes of data, will
0E25  8312 ;       pad the remainder of the block with data bytes of zeros. This
0E25  8313 ;       is accomplished by writing two consecutive blocks each with
0E25  8314 ;       512 bytes of all ones. Then a command packet is sent to
0E25  8315 ;       write the first block with one byte of alternating ones and
0E25  8316 ;       zeroes. This command should write the first byte with
0E25  8317 ;       10101010 and the remaining 511 bytes with 00000000. The second
0E25  8318 ;       block should still contain 512 bytes of all one's data. This data
0E25  8319 ;       is read and checked. All end packets and data packets are checked as
0E25  8320 ;       the subtest progresses. All byte transactions between host and TU58 are
0E25  8321 ;       timed. If any errors are encountered, they are reported.
0E25  8322 ;
0E25  8323 ;
0E25  8324 ; SUBTEST STEPS:
0E25  8325 ;
0E25  8326 ;
0E25  8327 ;       SUBTEST WRITE BLOCK PADDED ZEROS
0E25  8328 ;       :  Clear buffer
0E25  8329 ;       :  Point to first write command packet
0E25  8330 ;       :  DO for count = 1 to 3
0E25  8331 ;       :  :  REPEAT
0E25  8332 ;       :  :  :  Send command packet byte at a time
0E25  8333 ;       :  :  :  Set timer
0E25  8334 ;       :  :  :  IF timer expired AND no response
0E25  8335 ;       :  :  :  :  THEN
0E25  8336 ;       :  :  :  :  Report no response error
0E25  8337 ;       :  :  :  :  Exit test
0E25  8338 ;       :  :  :  ENDIF
0E25  8339 ;       :  :  : UNTIL all bytes sent
0E25  8340 ;       :  :  ENDREPEAT
0E25  8341 ;       :  :  DO for count = 1 to 4
0E25  8342 ;       :  :  :  Wait for continue
0E25  8343 ;       :  :  :  Set timer
0E25  8344 ;       :  :  :  IF timer expired AND no continue
0E25  8345 ;       :  :  :  :  THEN
0E25  8346 ;       :  :  :  :  Report no continue error
0E25  8347 ;       :  :  :  :  Exit test
0E25  8348 ;       :  :  :  ENDIF
0E25  8349 ;       :  :  :  Point to data packet
0E25  8350 ;       :  :  :  REPEAT
0E25  8351 ;       :  :  :  :  Send data packet byte at a time
0E25  8352 ;       :  :  :  :  Set timer
0E25  8353 ;       :  :  :  :  IF timer expired AND no response
0E25  8354 ;       :  :  :  :  :  THEN
0E25  8355 ;       :  :  :  :  :  Report no response error
0E25  8356 ;       :  :  :  :  :  Exit test
0E25  8357 ;       :  :  :  :  ENDIF
0E25  8358 ;       :  :  :  : UNTIL all bytes sent
0E25  8359 ;       :  :  :  ENDREPEAT
0E25  8360 ;       :  :  ENDDO
```

```
0E25  8361 ;        :  :  REPEAT
0E25  8362 ;        :  :  :  Set timer
0E25  8363 ;        :  :  :  IF timer expired AND done set
0E25  8364 ;        :  :  :  :  THEN
0E25  8365 ;        :  :  :  :  :  Read byte
0E25  8366 ;        :  :  :  ENDIF
0E25  8367 ;        :  :  : UNTIL timer expired AND done clear
0E25  8368 ;        :  :  ENDREPEAT
0E25  8369 ;        :  :  IF expected byte count NEQ actual byte count
0E25  8370 ;        :  :  :  THEN
0E25  8371 ;        :  :  :  :  Report error
0E25  8372 ;        :  :  :  :  Exit test
0E25  8373 ;        :  :  ENDIF
0E25  8374 ;        :  :  REPEAT
0E25  8375 ;        :  :  :  Point to expected end packet
0E25  8376 ;        :  :  :  IF expected end data NEQ received end data
0E25  8377 ;        :  :  :  :  THEN
0E25  8378 ;        :  :  :  :  Report end packet data error
0E25  8379 ;        :  :  :  ENDIF
0E25  8380 ;        :  :  : UNTIL all data checked
0E25  8381 ;        :  :  ENDREPEAT
0E25  8382 ;        :  :  Point to next write command
0E25  8383 ;        :  ENDDO
0E25  8384 ;        :  Clear buffer
0E25  8385 ;        :  Point to first read command packet
0E25  8386 ;        :  DO for count = 1 to 2
0E25  8387 ;        :  :  REPEAT
0E25  8388 ;        :  :  :  Send command packet byte at a time
0E25  8389 ;        :  :  :  Set timer
0E25  8390 ;        :  :  :  IF timer expired and no response
0E25  8391 ;        :  :  :  :  THEN
0E25  8392 ;        :  :  :  :  Report no response error
0E25  8393 ;        :  :  :  :  Exit test
0E25  8394 ;        :  :  :  ENDIF
0E25  8395 ;        :  :  : UNTIL all bytes sent
0E25  8396 ;        :  :  ENDREPEAT
0E25  8397 ;        :  :  :  REPEAT
0E25  8398 ;        :  :  :  Set timer
0E25  8399 ;        :  :  :  IF timer expired AND done set
0E25  8400 ;        :  :  :  :  THEN
0E25  8401 ;        :  :  :  :  :  Read byte
0E25  8402 ;        :  :  :  ENDIF
0E25  8403 ;        :  :  : UNTIL timer expired AND done clear
0E25  8404 ;        :  :  ENDREPEAT
0E25  8405 ;        :  :  IF expected byte count NEQ actual byte count
0E25  8406 ;        :  :  :  THEN
0E25  8407 ;        :  :  :  :  Report error
0E25  8408 ;        :  :  :  :  Exit test
0E25  8409 ;        :  :  ENDIF
0E25  8410 ;        :  :  REPEAT
0E25  8411 ;        :  :  :  Point to expected data packet
0E25  8412 ;        :  :  :  REPEAT
0E25  8413 ;        :  :  :  :  IF data expected NEQ data received
0E25  8414 ;        :  :  :  :  :  THEN
0E25  8415 ;        :  :  :  :  :  Report data error
```

```
                     0E25  8416 ;       :  :  :  :  : Exit subtest
                     0E25  8417 ;       :  :  :  : ENDIF
                     0E25  8418 ;       :  :  :  : Point to next byte of data
                     0E25  8419 ;       :  :  :  : UNTIL all data in packet checked
                     0E25  8420 ;       :  :  : ENDREPEAT
                     0E25  8421 ;       :  :  : UNTIL 4 data packets checked
                     0E25  8422 ;       :  : ENDREPEAT
                     0E25  8423 ;       :  : Point to expected end packet
                     0E25  8424 ;       :  : REPEAT
                     0E25  8425 ;       :  :  : IF end data expected NEQ end data received
                     0E25  8426 ;       :  :  : THEN
                     0E25  8427 ;       :  :  : Report end packet data error
                     0E25  8428 ;       :  :  : Exit subtest
                     0E25  8429 ;       :  :  : ENDIF
                     0E25  8430 ;       :  :  : UNTIL all end packet bytes checked
                     0E25  8431 ;       :  : ENDREPEAT
                     0E25  8432 ;       : ENDDO
                     0E25  8433 ;       ENDSUBTEST WRITE BLOCK PADDED ZEROS
                     0E25  8434 ;
                     0E25  8435 ;
                     0E25  8436 ;
                     0E25  8437 ;.page
                     0E25  8438 ;-
                     0E25  8439         $DS_BGNSUB
                     0E25       T12_S8::
00010030 9F   00000144'EF   FA  0E25                CALLG   $S$, a#DS$BGNSUB
         00000004'EF   94   90  0E30  8440          CLRB    B_COUNT1                ; initialize command counter
         00000005'EF   03   90  0E36  8441          MOVB    #3,B_COUNT2             ; init data packet counter
0000000E'EF   00000084 8F   D0  0E3D  8442          MOVL    #132,L_COUNT3           ; init data counter
         53   000015B3'EF   9E  0E48  8443          MOVAB   MCOMMAND_TBL_1,R3       ; load pointer to command table
                             0E4F  8444                                          ; clear buffers .
         00000000'EF   94   0E4F  8445 10$:     CLRB    B_FLAGS                 ; initialize flags
         58   00000000'FF   9E  0E55  8446          MOVAB   @A_BUFFER_BEGIN,R8      ; load buffer starting address
         59   00000600 8F   D0  0E5C  8447          MOVL    #BUFFER_SIZE,R9         ; do all pages
              00002134'EF   16  0E63  8448          JSB     CLEAR_BUFFER            ; go clear buffers
                            0E69  8449                                          ; send write command
         54   FFF3CB00 8F   D0  0E69  8450          MOVL    #DELAY_TIME3,R4         ; load send packet delay time
                   55   93   DE  0E70  8451          MOVAL   @(R3)+,R5               ; point to write command packet
                   57   0E   D0  0E73  8452          MOVL    #14,R7                  ; load transfer byte count
              0000203D'EF   16  0E76  8453          JSB     SEND_TU58               ; send command packet
      24 00000000'EF   00   E1  0E7C  8454          BBC     #V_CLOCK_FLAG,B_FLAGS,30$ ; br = no timeout error
                            0E84  8455          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=NO_READY
              00001BEB'EF   DF  0E84                PUSHAL  NO_READY
              000018C8'EF   DF  0E8A                PUSHAL  T_WR_BLK_ERR
                         00   DD  0E90                PUSHL   #0
                         01   DD  0E92                PUSHL   #$ER
                              0E94       ;;; TEST 12, SUBTEST 8, ERROR 1
         000100D0 9F   04   FB  0E94                CALLS   #$$M, a#DS$ERRHARD
                              0E9B  8456          $DS_BNCOMPLETE  20$
                      03 50   E9  0E9B                BLBC    R0, 20$
                              0E9E  8457          $DS_ABORT       TEST
                         50   D4  0E9E                CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                         04   0EA0                RET                             ; TERMINATE TEST
                              0EA1  8458 20$:     $DS_ABORT
         00010020 9F   6C   FA  0EA1                CALLG   (AP), a#DS$ABORT
```

```
                                0EA8  8459                                                  ; read continue
        00000003'EF     94      0EA8  8460 30$:    CLRB    B_COUNT                          ; initialize data packet counter
   54   FFC2F700 8F     D0      0EAE  8461 35$:    MOVL    #DELAY_TIME6,R4                  ; load receive packet delay time
   55   00000000'FF     9E      0EB5  8462         MOVAB   @A_BUFFER_BEGIN,R5               ; load buffer address to store data
      57   55   01      C1      0EBC  8463         ADDL3   #1,R5,R7                         ; load last expected address of data
        000020C8'EF     16      0EC0  8464         JSB     MRECEIVE_TU58                    ; go get data from TU58
   5A   00000023'EF     9E      0EC6  8465         MOVAB   B_CONTINUE,R10                   ; load address of expected data
   5B   00000000'FF     9E      0ECD  8466         MOVAB   @A_BUFFER_BEGIN,R11              ; load address of actual data
           57   55      D1      0ED4  8467         CMPL    R5,R7                            ; check for correct number of bytes
                2A      13      0ED7  8468         BEQL    70$                              ; br = correct number of bytes
                                0ED9  8469 37$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=REC_ERR,-
                                0ED9  8470                         P1=#T_REC_CONT
        00001D47'8F     DD      0ED9                       PUSHL   #T_REC_CONT
        00001EB4'EF     DF      0EDF                       PUSHAL  REC_ERR
        000018C8'EF     DF      0EE5                       PUSHAL  T_WR_BLK_ERR
                00      DD      0EEB                       PUSHL   #0
                02      DD      0EED                       PUSHL   #$ER
                                0EEF       ;;; TEST 12, SUBTEST 8, ERROR 2
   000100D0 9F   05     FB      0EEF                       CALLS   #$$M, @#DS$ERRHARD
                                0EF6  8471         $DS_BNCOMPLETE  40$
             03 50      E9      0EF6                       BLBC    R0, 40$
                                0EF9  8472         $DS_ABORT       TEST
                50      D4      0EF9                       CLRL    R0                       ; SEND A WARNING TO THE SUPERVISOR
                        04      0EFB                       RET                              ; TERMINATE TEST
                                0EFC  8473
                                0EFC  8474 40$:    $DS_ABORT
   00010020 9F   6C     FA      0EFC                       CALLG   (AP), @#DS$ABORT
                                0F03  8475                                                  ; check continue
           5C   01      D0      0F03  8476 70$:    MOVL    #1,R12                           ; load number of bytes to check
                                0F06  8477         $DS_BREAK
   00010058 9F   6E     FA      0F06                       CALLG   (SP), @#DS$BREAK
        0000213B'EF     16      0F0D  8478         JSB     CHECK_PACKET                     ; go check continue
                                0F13  8479         $DS_BNCOMPLETE  90$                      ; br = no error
             24 50      E9      0F13                       BLBC    R0, 90$
                                0F16  8480         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=DATA_ERR_CONT
        00001E4D'EF     DF      0F16                       PUSHAL  DATA_ERR_CONT
        000018C8'EF     DF      0F1C                       PUSHAL  T_WR_BLK_ERR
                00      DD      0F22                       PUSHL   #0
                03      DD      0F24                       PUSHL   #$ER
                                0F26       ;;; TEST 12, SUBTEST 8, ERROR 3
   000100D0 9F   04     FB      0F26                       CALLS   #$$M, @#DS$ERRHARD
                                0F2D  8481         $DS_BNCOMPLETE  80$
             03 50      E9      0F2D                       BLBC    R0, 80$
                                0F30  8482         $DS_ABORT       TEST
                50      D4      0F30                       CLRL    R0                       ; SEND A WARNING TO THE SUPERVISOR
                        04      0F32                       RET                              ; TERMINATE TEST
                                0F33  8483 80$:    $DS_ABORT
   00010020 9F   6C     FA      0F33                       CALLG   (AP), @#DS$ABORT
                                0F3A  8484                                                  ; send data packet
   54   FFFB6C20 8F     D0      0F3A  8485 90$:    MOVL    #DELAY_TIME1,R4                  ; load send packet delay time
           55   93      DE      0F41  8486         MOVAL   @(R3)+,R5                        ; point to data packet
   57   0000000E'EF     D0      0F44  8487         MOVL    L_COUNT3,R7                      ; load transfer byte count
        0000203D'EF     16      0F4B  8488         JSB     SEND_TU58                        ; send data packet
24 00000000'EF   00     E1      0F51  8489         BBC     #V_CLOCK_FLAG,B_FLAGS,110$ ; br = no timeout error
                                0F59  8490         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=NO_READY
```

```
                00001BEB'EF    DF  0F59                        PUSHAL  NO_READY
                000018C8'EF    DF  0F5F                        PUSHAL  T_WR_BLK_ERR
                          00   DD  0F65                        PUSHL   #0
                          04   DD  0F67                        PUSHL   #$ER
                               0F69        ;;; TEST 12, SUBTEST 8, ERROR 4
           000100D0 9F    04   FB  0F69                        CALLS   #$$M, a#DS$ERRHARD
                               0F70  8491          $DS_BNCOMPLETE  100$
                       03 50   E9  0F70                        BLBC    R0, 100$
                               0F73  8492          $DS_ABORT       TEST
                          50   D4  0F73                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                          04   0F75                            RET                         ; TERMINATE TEST
                               0F76  8493 100$:    $DS_ABORT
           00010020 9F    6C   FA  0F76                        CALLG   (AP), a#DS$ABORT
                               0F7D  8494
                00000000'FF    94  0F7D  8495 110$:    CLRB    aA_BUFFER_BEGIN             ; clear buffer location used for data
00000003'EF    01    00000005'EF  9D  0F83  8496              ACBB    B_COUNT2,#1,B_COUNT,35$ ; br = not finished sending data
                             FF1D  0F8F
                               0F91  8497                                                  ; read end packet
           54   FFE17B80 8F    D0  0F91  8498 115$:    MOVL    #DELAY_TIME5,R4             ; load receive packet delay time
           55   00000000'FF    9E  0F98  8499              MOVAB   aA_BUFFER_BEGIN,R5      ; load buffer address to store data
                57   55   0E    C1  0F9F  8500              ADDL3   #14,R5,R7               ; load last expected address of data
                000020C8'EF    16  0FA3  8501              JSB     MRECEIVE_TU58           ; go get data from TU58
                     5A   93    DE  0FA9  8502              MOVAL   a(R3)+,R10              ; load address of expected end packet
           5B   00000000'FF    9E  0FAC  8503              MOVAB   aA_BUFFER_BEGIN,R11     ; load address of actual end packet
                     57   55    D1  0FB3  8504              CMPL    R5,R7                   ; check for correct number of bytes
                          31   13  0FB6  8505              BEQL    150$                    ; br = correct number of bytes
           00000000'EF    08   88  0FB8  8506              BISB2   #M_END_FLAG,B_FLAGS     ; set end error flag
                               0FBF  8507 117$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=REC_ERR,-
                               0FBF  8508                          P1=#T_REC_END
                00001D2E'8F    DD  0FBF                        PUSHL   #T_REC_END
                00001EB4'EF    DF  0FC5                        PUSHAL  REC_ERR
                000018C8'EF    DF  0FCB                        PUSHAL  T_WR_BLK_ERR
                          00   DD  0FD1                        PUSHL   #0
                          05   DD  0FD3                        PUSHL   #$ER
                               0FD5        ;;; TEST 12, SUBTEST 8, ERROR 5
           000100D0 9F    05   FB  0FD5                        CALLS   #$$M, a#DS$ERRHARD
                               0FDC  8509          $DS_BNCOMPLETE  120$
                       03 50   E9  0FDC                        BLBC    R0, 120$
                               0FDF  8510          $DS_ABORT       TEST
                          50   D4  0FDF                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                          04   0FE1                            RET                         ; TERMINATE TEST
                               0FE2  8511
                               0FE2  8512 120$:    $DS_ABORT
           00010020 9F    6C   FA  0FE2                        CALLG   (AP), a#DS$ABORT
                               0FE9  8513                                                  ; check end packet
                    5C   0E    D0  0FE9  8514 150$:    MOVL    #14,R12                     ; load number of bytes to check
                               0FEC  8515          $DS_BREAK
           00010058 9F    6E   FA  0FEC                        CALLG   (SP), a#DS$BREAK
                0000213B'EF    16  0FF3  8516              JSB     CHECK_PACKET            ; go check end packet
                               0FF9  8517          $DS_BNCOMPLETE  160$                    ; br = no error
                       24 50   E9  0FF9                        BLBC    R0, 160$
                               0FFC  8518          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=DATA_ERR_END
                00001E9D'EF    DF  0FFC                        PUSHAL  DATA_ERR_END
                000018C8'EF    DF  1002                        PUSHAL  T_WR_BLK_ERR
                          00   DD  1008                        PUSHL   #0
```

```
                    06   DD  100A                          PUSHL   #$ER
                             100C        ;;; TEST 12, SUBTEST 8, ERROR 6
        000100D0 9F  04   FB  100C                          CALLS   #$$M, a#DS$ERRHARD
                             1013  8519          $DS_BNCOMPLETE  155$
                 03 50   E9  1013                          BLBC    R0, 155$
                             1016  8520          $DS_ABORT       TEST
                    50   D4  1016                          CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                         04  1018                          RET                         ; TERMINATE TEST
                             1019  8521 155$:    $DS_ABORT
        00010020 9F  6C   FA  1019                          CALLG   (AP), a#DS$ABORT
          1A 00000005'EF  E9  1020  8522 160$:    BLBC    B_COUNT2,165$               ; go do read commands if writes done
  FE1E 00000004'EF  01  01  9D  1027  8523          ACBB    #1,#1,B_COUNT1,10$          ; br = not finished
             00000005'EF  94  1031  8524          CLRB    B_COUNT2                    ; set data packet counter for 1 packet
        0000000E'EF  05   D0  1037  8525          MOVL    #5,L_COUNT3                 ; set data count to 5 bytes
                   FE0E  31  103E  8526          BRW     10$                         ; go do last write
             00000004'EF  94  1041  8527 165$:    CLRB    B_COUNT1                    ; initialize command counter
                             1047  8528                                              ; clear buffers
             00000000'EF  94  1047  8529 170$:    CLRB    B_FLAGS                     ; initialize flags
        58   00000000'FF  9E  104D  8530          MOVAB   aA_BUFFER_BEGIN,R8          ; load buffer starting address
        59   00000600 8F  D0  1054  8531          MOVL    #BUFFER_SIZE,R9             ; do all pages
             00002134'EF  16  105B  8532          JSB     CLEAR_BUFFER                ; go clear buffers
                             1061  8533                                              ; send read command
        54   FFFB6C20 8F  D0  1061  8534          MOVL    #DELAY_TIME1,R4             ; load send packet delay time
                  55  93  DE  1068  8535          MOVAL   a(R3)+,R5                   ; point to read command packet
                  57  0E  D0  106B  8536          MOVL    #14,R7                      ; load transfer byte count
             0000203D'EF  16  106E  8537          JSB     SEND_TU58                   ; send command packet
     24 00000000'EF  00   E1  1074  8538          BBC     #V_CLOCK_FLAG,B_FLAGS,190$ ; br = no timeout error
                             107C  8539          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=NO_READY
             00001BEB'EF  DF  107C                          PUSHAL  NO_READY
             000018EB'EF  DF  1082                          PUSHAL  T_RD_BLK_ERR
                    00   DD  1088                          PUSHL   #0
                    07   DD  108A                          PUSHL   #$ER
                             108C        ;;; TEST 12, SUBTEST 8, ERROR 7
        000100D0 9F  04   FB  108C                          CALLS   #$$M, a#DS$ERRHARD
                             1093  8540          $DS_BNCOMPLETE  180$
                 03 50   E9  1093                          BLBC    R0, 180$
                             1096  8541          $DS_ABORT       TEST
                    50   D4  1096                          CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                         04  1098                          RET                         ; TERMINATE TEST
                             1099  8542 180$:    $DS_ABORT
        00010020 9F  6C   FA  1099                          CALLG   (AP), a#DS$ABORT
                             10A0  8543                                              ; read data and end packets
        54   FFE17B80 8F  D0  10A0  8544 190$:    MOVL    #DELAY_TIME5,R4             ; load receive packet delay time
        55   00000000'FF  9E  10A7  8545          MOVAB   aA_BUFFER_BEGIN,R5          ; load buffer address to store data
  57    55   0000021E 8F  C1  10AE  8546          ADDL3   #542,R5,R7                  ; load last expected address of data
             000020C8'EF  16  10B6  8547          JSB     MRECEIVE_TU58               ; go get data from TU58
        5B   00000000'FF  9E  10BC  8548          MOVAB   aA_BUFFER_BEGIN,R11         ; load address of actual data
                  5A  93  DE  10C3  8549          MOVAL   a(R3)+,R10                  ; load address of expected data
                  57  55  D1  10C6  8550          CMPL    R5,R7                       ; check for correct number of bytes
                    31  13  10C9  8551          BEQL    230$                        ; br = correct number of bytes
        00000000'EF  04   88  10CB  8552          BISB2   #M_DATA_FLAG,B_FLAGS        ; set data error flag
                             10D2  8553 195$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=REC_ERR,-
                             10D2  8554                          P1=#T_REC_DATA
             00001D68'8F  DD  10D2                          PUSHL   #T_REC_DATA
             00001EB4'EF  DF  10D8                          PUSHAL  REC_ERR
```

```
                000018EB'EF   DF  10DE                        PUSHAL  T_RD_BLK_ERR
                          00  DD  10E4                        PUSHL   #0
                          08  DD  10E6                        PUSHL   #$ER
                              10E8          ;;; TEST 12, SUBTEST 8, ERROR 8
          000100D0 9F     05  FB  10E8                        CALLS   #$$M, a#DS$ERRHARD
                              10EF  8555        $DS_BNCOMPLETE  200$
                       03 50  E9  10EF                        BLBC    R0, 200$
                              10F2  8556        $DS_ABORT       TEST
                          50  D4  10F2                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                          04  10F4                            RET                     ; TERMINATE TEST
                              10F5  8557
                              10F5  8558 200$:  $DS_ABORT
          00010020 9F     6C  FA  10F5                        CALLG   (AP), a#DS$ABORT
                              10FC  8559                                              ; check data packets
                00000003'EF   94  10FC  8560 230$:  CLRB    B_COUNT                 ; clear counter to check 4 packets
       5C 00000084 8F     D0  1102  8561          MOVL    #132,R12                ; load number of bytes to check
                              1109  8562 240$:  $DS_BREAK
          00010058 9F     6E  FA  1109                        CALLG   (SP), a#DS$BREAK
                0000213B'EF   16  1110  8563          JSB     CHECK_PACKET            ; go check data packet
                              1116  8564          $DS_BNCOMPLETE  260$              ; br = no error
                       24 50  E9  1116                        BLBC    R0, 260$
                              1119  8565          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=DATA_ERR_DATA
                00001E75'EF   DF  1119                        PUSHAL  DATA_ERR_DATA
                000018EB'EF   DF  111F                        PUSHAL  T_RD_BLK_ERR
                          00  DD  1125                        PUSHL   #0
                          09  DD  1127                        PUSHL   #$ER
                              1129          ;;; TEST 12, SUBTEST 8, ERROR 9
          000100D0 9F     04  FB  1129                        CALLS   #$$M, a#DS$ERRHARD
                              1130  8566        $DS_BNCOMPLETE  250$
                       03 50  E9  1130                        BLBC    R0, 250$
                              1133  8567        $DS_ABORT       TEST
                          50  D4  1133                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                          04  1135                            RET                     ; TERMINATE TEST
                              1136  8568 250$:  $DS_ABORT
          00010020 9F     6C  FA  1136                        CALLG   (AP), a#DS$ABORT
       5B 00000084 8F     C0  113D  8569 260$:  ADDL2   #132,R11                 ; adjust pointer to next packet
                       5A 93  DE  1144  8570          MOVAL   a(R3)+,R10              ; load address of expected data
FFB8 00000003'EF       01  03  9D  1147  8571          ACBB    #3,#1,B_COUNT,240$      ; br = not finished checking data
                              1151  8572                                          ; check end packet
                       5C 0E  D0  1151  8573          MOVL    #14,R12                 ; load number of bytes to check
                              1154  8574          $DS_BREAK
          00010058 9F     6E  FA  1154                        CALLG   (SP), a#DS$BREAK
                0000213B'EF   16  115B  8575          JSB     CHECK_PACKET            ; go check end packet
                              1161  8576          $DS_BNCOMPLETE  270$              ; br = no error
                       24 50  E9  1161                        BLBC    R0, 270$
                              1164  8577          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=DATA_ERR_END
                00001E9D'EF   DF  1164                        PUSHAL  DATA_ERR_END
                000018EB'EF   DF  116A                        PUSHAL  T_RD_BLK_ERR
                          00  DD  1170                        PUSHL   #0
                          0A  DD  1172                        PUSHL   #$ER
                              1174          ;;; TEST 12, SUBTEST 8, ERROR 10
          000100D0 9F     04  FB  1174                        CALLS   #$$M, a#DS$ERRHARD
                              117B  8578        $DS_BNCOMPLETE  265$
                       03 50  E9  117B                        BLBC    R0, 265$
                              117E  8579        $DS_ABORT       TEST
```

```
                        50   D4  117E                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                             04  1180                        RET                     ; TERMINATE TEST
                                 1181  8580 265$:   $DS_ABORT
          00010020 9F   6C   FA  1181                        CALLG   (AP), a#DS$ABORT
    FEB5 00000003'EF    01   01  9D  1188  8581 270$:   ACBB    #1,#1,B_COUNT,170$      ; br = not finished reading
                                 1192  8582
                                 1192  8583
                                 1192  8584
                                 1192  8585
                                 1192  8586         $DS_ENDSUB
                                 1192        T12_S8_X:
     00010038 9F   00000144'EF   FA  1192                        CALLG   $S$, a#DS$ENDSUB
                                 119D  8587
                                 119D  8588         $DS_PAGE
```

```
                        .SBTTL  SUBTEST 12.9:   WRITE RECORD - PADDED ZEROS
119D  8591 ;+
119D  8592 ; SUBTEST DESCRIPTION:
119D  8593 ;
119D  8594 ;       This subtest sends the TU58 a series of command packets to check
119D  8595 ;       that a record written with less than 128 bytes of data, will
119D  8596 ;       pad the remainder of the record with data bytes of zeroes. This
119D  8597 ;       is accomplished by writing two consecutive records each with
119D  8598 ;       128 bytes of all ones. Then a command packet is sent to
119D  8599 ;       write the first record with one byte of alternating ones and
119D  8600 ;       zeroes data. This command should write the first byte with
119D  8601 ;       10101010 and the remaining 127 bytes with 00000000. The second
119D  8602 ;       block should still contain 128 bytes of all ones data. This data
119D  8603 ;       is read and checked. All end packets and data packets are checked as
119D  8604 ;       the subtest progresses. All byte transactions between the host and TU58
119D  8605 ;       are timed. If any errors are encountered, they are reported.
119D  8606 ;
119D  8607 ;
119D  8608 ; SUBTEST STEPS:
119D  8609 ;
119D  8610 ;
119D  8611 ;       SUBTEST WRITE RECORD PADDED ZEROS
119D  8612 ;       :  Clear buffer
119D  8613 ;       :  Point to first write command packet
119D  8614 ;       :  DO for count = 1 to 3
119D  8615 ;       :  :  REPEAT
119D  8616 ;       :  :  :  Send command packet byte at a time
119D  8617 ;       :  :  :  Set timer
119D  8618 ;       :  :  :  IF timer expired AND no response
119D  8619 ;       :  :  :  :  THEN
119D  8620 ;       :  :  :  :  Report no response error
119D  8621 ;       :  :  :  :  Exit test
119D  8622 ;       :  :  :  ENDIF
119D  8623 ;       :  :  : UNTIL all bytes sent
119D  8624 ;       :  :  ENDREPEAT
119D  8625 ;       :  :  Wait for continue
119D  8626 ;       :  :  Set timer
119D  8627 ;       :  :  IF timer expired AND no continue
119D  8628 ;       :  :  :  THEN
119D  8629 ;       :  :  :  Report no continue error
119D  8630 ;       :  :  :  Exit test
119D  8631 ;       :  :  ENDIF
119D  8632 ;       :  :  Point to data packet
119D  8633 ;       :  :  REPEAT
119D  8634 ;       :  :  :  Send data packet byte at a time
119D  8635 ;       :  :  :  Set timer
119D  8636 ;       :  :  :  IF timer expired AND no response
119D  8637 ;       :  :  :  :  THEN
119D  8638 ;       :  :  :  :  Report no response error
119D  8639 ;       :  :  :  :  Exit test
119D  8640 ;       :  :  :  ENDIF
119D  8641 ;       :  :  : UNTIL all bytes sent
119D  8642 ;       :  :  ENDREPEAT
119D  8643 ;       :  :  REPEAT
119D  8644 ;       :  :  :  Set timer
```

```
119D  8645 ;       :  :  :  IF timer expired AND done set
119D  8646 ;       :  :  :  :  THEN
119D  8647 ;       :  :  :  :  :  Read byte
119D  8648 ;       :  :  :  ENDIF
119D  8649 ;       :  :  : UNTIL timer expired AND done clear
119D  8650 ;       :  :  ENDREPEAT
119D  8651 ;       :  :  IF expected byte count NEQ actual byte count
119D  8652 ;       :  :  :  THEN
119D  8653 ;       :  :  :  :  Report error
119D  8654 ;       :  :  :  :  Exit test
119D  8655 ;       :  :  ENDIF
119D  8656 ;       :  :  REPEAT
119D  8657 ;       :  :  :  Point to expected end packet
119D  8658 ;       :  :  :  IF expected end data NEQ received end data
119D  8659 ;       :  :  :  :  THEN
119D  8660 ;       :  :  :  :  Report end packet data error
119D  8661 ;       :  :  :  ENDIF
119D  8662 ;       :  :  : UNTIL all data checked
119D  8663 ;       :  :  ENDREPEAT
119D  8664 ;       :  :  Point to next write command
119D  8665 ;       :  ENDDO
119D  8666 ;       :  Clear buffer
119D  8667 ;       :  Point to first read command packet
119D  8668 ;       :  DO for count = 1 to 2
119D  8669 ;       :  :  REPEAT
119D  8670 ;       :  :  :  Send command packet byte at a time
119D  8671 ;       :  :  :  Set timer
119D  8672 ;       :  :  :  IF timer expired and no response
119D  8673 ;       :  :  :  :  THEN
119D  8674 ;       :  :  :  :  Report no response error
119D  8675 ;       :  :  :  :  Exit test
119D  8676 ;       :  :  :  ENDIF
119D  8677 ;       :  :  : UNTIL all bytes sent
119D  8678 ;       :  :  ENDREPEAT
119D  8679 ;       :  :  REPEAT
119D  8680 ;       :  :  :  Set timer
119D  8681 ;       :  :  :  IF timer expired AND done set
119D  8682 ;       :  :  :  :  THEN
119D  8683 ;       :  :  :  :  :  Read byte
119D  8684 ;       :  :  :  ENDIF
119D  8685 ;       :  :  : UNTIL timer expired AND done clear
119D  8686 ;       :  :  ENDREPEAT
119D  8687 ;       :  :  IF expected byte count NEQ actual byte count
119D  8688 ;       :  :  :  THEN
119D  8689 ;       :  :  :  :  Report error
119D  8690 ;       :  :  :  :  Exit test
119D  8691 ;       :  :  ENDIF
119D  8692 ;       :  :  Point to expected data packet
119D  8693 ;       :  :  REPEAT
119D  8694 ;       :  :  :  IF data expected NEQ data received
119D  8695 ;       :  :  :  :  THEN
119D  8696 ;       :  :  :  :  Report data error
119D  8697 ;       :  :  :  :  Exit subtest
119D  8698 ;       :  :  :  ENDIF
119D  8699 ;       :  :  :  Point to next byte of data
```

```
                                119D  8700 ;       :  :  : UNTIL all data in packet checked
                                119D  8701 ;       :  :  ENDREPEAT
                                119D  8702 ;       :  :  Point to expected end packet
                                119D  8703 ;       :  :  REPEAT
                                119D  8704 ;       :  :  :  IF end data expected NEQ end data received
                                119D  8705 ;       :  :  :  :  THEN
                                119D  8706 ;       :  :  :  :  Report end packet data error
                                119D  8707 ;       :  :  :  :  Exit subtest
                                119D  8708 ;       :  :  :  ENDIF
                                119D  8709 ;       :  :  : UNTIL all end packet bytes checked
                                119D  8710 ;       :  :  ENDREPEAT
                                119D  8711 ;       :  ENDDO
                                119D  8712 ;       ENDSUBTEST WRITE RECORD PADDED ZEROS
                                119D  8713 ;
                                119D  8714 ;
                                119D  8715 ;
                                119D  8716 ;.page
                                119D  8717 ;-
                                119D  8718         $DS_BGNSUB
                                119D               T12_S9::
00010030 9F   00000150'EF   FA  119D                       CALLG   $S$, a#DS$BGNSUB
                                11A8  8719
          00000004'EF       94  11A8  8720               CLRB    B_COUNT1                ; initialize command counter
0000000E'EF   00000084 8F   D0  11AE  8721               MOVL    #132,L_COUNT3           ; init byte count
          53  0000161F'EF   9E  11B9  8722               MOVAB   MCOMMAND_TBL_2,R3       ; load pointer to command table
                                11C0  8723                                               ; clear buffers
          00000000'EF       94  11C0  8724 10$:          CLRB    B_FLAGS                 ; initialize flags
       58 00000000'FF       9E  11C6  8725               MOVAB   @A_BUFFER_BEGIN,R8      ; load buffer starting address
       59 00000600 8F       D0  11CD  8726               MOVL    #BUFFER_SIZE,R9         ; do all pages
          00002134'EF       16  11D4  8727               JSB     CLEAR_BUFFER            ; go clear buffers
                                11DA  8728                                               ; send write command
       54 FFF3CB00 8F       D0  11DA  8729               MOVL    #DELAY_TIME3,R4         ; load send packet delay time
             55    93       DE  11E1  8730               MOVAL   @(R3)+,R5               ; point to write command packet
             57    0E       D0  11E4  8731               MOVL    #14,R7                  ; load transfer byte count
          0000203D'EF       16  11E7  8732               JSB     SEND_TU58               ; send command packet
24 00000000'EF      00      E1  11ED  8733               BBC     #V_CLOCK_FLAG,B_FLAGS,30$ ; br = no timeout error
                                11F5  8734               $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
          00001BEB'EF       DF  11F5                       PUSHAL  NO_READY
          0000190D'EF       DF  11FB                       PUSHAL  T_WR_REC_ERR
                    00      DD  1201                       PUSHL   #0
                    01      DD  1203                       PUSHL   #$ER
                                1205               ;;; TEST 12, SUBTEST 9, ERROR 1
000100D0 9F         04      FB  1205                       CALLS   #$$M, a#DS$ERRHARD
                                120C  8735               $DS_BNCOMPLETE  20$
                 03 50      E9  120C                       BLBC    R0, 20$
                                120F  8736               $DS_ABORT       TEST
                    50      D4  120F                       CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                            04  1211                       RET                             ; TERMINATE TEST
                                1212  8737 20$:          $DS_ABORT
00010020 9F         6C      FA  1212                       CALLG   (AP), a#DS$ABORT
                                1219  8738                                               ; read continue
       54 FFF3CB00 8F       D0  1219  8739 30$:          MOVL    #DELAY_TIME3,R4         ; load receive packet delay time
       55 00000000'FF       9E  1220  8740               MOVAB   @A_BUFFER_BEGIN,R5      ; load buffer address to store data
          57    55    01      C1  1227  8741               ADDL3   #1,R5,R7                ; load last expected address of data
          000020C8'EF       16  122B  8742               JSB     MRECEIVE_TU58           ; go get data from TU58
```

```
                5A   00000023'EF   9E  1231  8743          MOVAB   B_CONTINUE,R10           ; load address of expected data
                5B   00000000'FF   9E  1238  8744          MOVAB   @A_BUFFER_BEGIN,R11     ; load address of actual data
                     57    55      D1  123F  8745          CMPL    R5,R7                   ; check for correct number of bytes
                           2A      13  1242  8746          BEQL    70$                     ; br = correct number of bytes
                                       1244  8747 35$:      $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                                       1244  8748                          P1=#T_REC_CONT
                     00001D47'8F       DD  1244                          PUSHL   #T_REC_CONT
                     00001EB4'EF       DF  124A                          PUSHAL  REC_ERR
                     0000190D'EF       DF  1250                          PUSHAL  T_WR_REC_ERR
                                 00    DD  1256                          PUSHL   #0
                                 02    DD  1258                          PUSHL   #$ER
                                       125A        ;;; TEST 12, SUBTEST 9, ERROR 2
                000100D0 9F      05   FB  125A                          CALLS   #$$M, @#DS$ERRHARD
                                       1261  8749          $DS_BNCOMPLETE  40$
                           03    50   E9  1261                          BLBC    R0, 40$
                                       1264  8750          $DS_ABORT       TEST
                                 50    D4  1264                          CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                                 04    1266                              RET                     ; TERMINATE TEST
                                       1267  8751
                                       1267  8752 40$:      $DS_ABORT
                00010020 9F      6C   FA  1267                          CALLG   (AP), @#DS$ABORT
                                       126E  8753                                              ; check continue
                           5C    01   D0  126E  8754 70$:      MOVL    #1,R12                  ; load number of bytes to check
                                       1271  8755          $DS_BREAK
                00010058 9F      6E   FA  1271                          CALLG   (SP), @#DS$BREAK
                     0000213B'EF       16  1278  8756          JSB     CHECK_PACKET            ; go check continue
                                       127E  8757          $DS_BNCOMPLETE  90$              ; br = no error
                           24    50   E9  127E                          BLBC    R0, 90$
                                       1281  8758          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_CONT
                     00001E4D'EF       DF  1281                          PUSHAL  DATA_ERR_CONT
                     0000190D'EF       DF  1287                          PUSHAL  T_WR_REC_ERR
                                 00    DD  128D                          PUSHL   #0
                                 03    DD  128F                          PUSHL   #$ER
                                       1291        ;;; TEST 12, SUBTEST 9, ERROR 3
                000100D0 9F      04   FB  1291                          CALLS   #$$M, @#DS$ERRHARD
                                       1298  8759          $DS_BNCOMPLETE  80$
                           03    50   E9  1298                          BLBC    R0, 80$
                                       129B  8760          $DS_ABORT       TEST
                                 50    D4  129B                          CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                                 04    129D                              RET                     ; TERMINATE TEST
                                       129E  8761 80$:      $DS_ABORT
                00010020 9F      6C   FA  129E                          CALLG   (AP), @#DS$ABORT
                                       12A5  8762                                              ; send data packet
                54   FFFB6C20 8F      D0  12A5  8763 90$:      MOVL    #DELAY_TIME1,R4         ; load send packet delay time
                          55    93   DE  12AC  8764          MOVAL   @(R3)+,R5               ; point to data packet
                57   0000000E'EF       D0  12AF  8765          MOVL    L_COUNT3,R7             ; load transfer byte count
                     0000203D'EF       16  12B6  8766          JSB     SEND_TU58               ; send data packet
            24 00000000'EF         00   E1  12BC  8767          BBC     #V_CLOCK_FLAG,B_FLAGS,110$ ; br = no timeout error
                                       12C4  8768          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
                     00001BEB'EF       DF  12C4                          PUSHAL  NO_READY
                     0000190D'EF       DF  12CA                          PUSHAL  T_WR_REC_ERR
                                 00    DD  12D0                          PUSHL   #0
                                 04    DD  12D2                          PUSHL   #$ER
                                       12D4        ;;; TEST 12, SUBTEST 9, ERROR 4
                000100D0 9F      04   FB  12D4                          CALLS   #$$M, @#DS$ERRHARD
```

```
                                12DB  8769          $DS_BNCOMPLETE  100$
                  03 50    E9   12DB                        BLBC    R0, 100$
                                12DE  8770          $DS_ABORT       TEST
                     50    D4   12DE                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                           04   12E0                        RET                         ; TERMINATE TEST
                                12E1  8771 100$:    $DS_ABORT
      00010020 9F    6C    FA   12E1                        CALLG   (AP), @#DS$ABORT
                                12E8  8772
           00000000'FF    94   12E8  8773 110$:    CLRB    @A_BUFFER_BEGIN             ; clear buffer used to store continue
                                12EE  8774                                             ; read end packet
      54   FFC2F700 8F    D0   12EE  8775          MOVL    #DELAY_TIME6,R4             ; load receive packet delay time
      55   00000000'FF    9E   12F5  8776          MOVAB   @A_BUFFER_BEGIN,R5          ; load buffer address to store data
          57    55    0E    C1   12FC  8777          ADDL3   #14,R5,R7                   ; load last expected address of data
           000020C8'EF    16   1300  8778          JSB     MRECEIVE_TU58               ; go get data from TU58
                 5A    93    DE   1306  8779          MOVAL   @(R3)+,R10                  ; load address of expected end packet
      5B   00000000'FF    9E   1309  8780          MOVAB   @A_BUFFER_BEGIN,R11         ; load address of actual end packet
                 57    55    D1   1310  8781          CMPL    R5,R7                       ; check for correct number of bytes
                     31    13   1313  8782          BEQL    150$                        ; br = correct number of bytes
      00000000'EF    08    88   1315  8783          BISB2   #M_END_FLAG,B_FLAGS         ; set end error flag
                                131C  8784 115$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                                131C  8785                          P1=#T_REC_END
           00001D2E'8F    DD   131C                        PUSHL   #T_REC_END
           00001EB4'EF    DF   1322                        PUSHAL  REC_ERR
           0000190D'EF    DF   1328                        PUSHAL  T_WR_REC_ERR
                     00    DD   132E                        PUSHL   #0
                     05    DD   1330                        PUSHL   #$ER
                                1332          ;;; TEST 12, SUBTEST 9, ERROR 5
      000100D0 9F    05    FB   1332                        CALLS   #$$M, @#DS$ERRHARD
                                1339  8786          $DS_BNCOMPLETE  120$
                  03 50    E9   1339                        BLBC    R0, 120$
                                133C  8787          $DS_ABORT       TEST
                     50    D4   133C                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                           04   133E                        RET                         ; TERMINATE TEST
                                133F  8788
                                133F  8789 120$:    $DS_ABORT
      00010020 9F    6C    FA   133F                        CALLG   (AP), @#DS$ABORT
                                1346  8790                                             ; check end packet
                 5C    0E    D0   1346  8791 150$:    MOVL    #14,R12                     ; load number of bytes to check
                                1349  8792          $DS_BREAK
      00010058 9F    6E    FA   1349                        CALLG   (SP), @#DS$BREAK
           0000213B'EF    16   1350  8793          JSB     CHECK_PACKET                ; go check end packet
                                1356  8794          $DS_BNCOMPLETE  160$                ; br = no error
                  24 50    E9   1356                        BLBC    R0, 160$
                                1359  8795          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_END
           00001E9D'EF    DF   1359                        PUSHAL  DATA_ERR_END
           0000190D'EF    DF   135F                        PUSHAL  T_WR_REC_ERR
                     00    DD   1365                        PUSHL   #0
                     06    DD   1367                        PUSHL   #$ER
                                1369          ;;; TEST 12, SUBTEST 9, ERROR 6
      000100D0 9F    04    FB   1369                        CALLS   #$$M, @#DS$ERRHARD
                                1370  8796          $DS_BNCOMPLETE  155$
                  03 50    E9   1370                        BLBC    R0, 155$
                                1373  8797          $DS_ABORT       TEST
                     50    D4   1373                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                           04   1375                        RET                         ; TERMINATE TEST
```

```
                        1376  8798 155$:   $DS_ABORT
          00010020 9F    6C    FA  1376                CALLG   (AP), a#DS$ABORT
            14 0000000E'EF    E8  137D  8799 160$:   BLBS    L_COUNT3,165$           ; go do reads if writes done
   FE32 00000004'EF    01    01  9D  1384  8800        ACBB    #1,#1,B_COUNT1,10$      ; br = not finished
          0000000E'EF    05    D0  138E  8801        MOVL    #5,L_COUNT3             ; load byte count for last write
                   FE28    31  1395  8802        BRW     10$                     ; go do last write
               00000004'EF    94  1398  8803 165$:   CLRB    B_COUNT1                ; initialize command counter
                        139E  8804                                                ; clear buffers
               00000000'EF    94  139E  8805 170$:   CLRB    B_FLAGS                 ; initialize flags
          58   00000000'FF    9E  13A4  8806        MOVAB   @A_BUFFER_BEGIN,R8      ; load buffer starting address
          59   00000600 8F    D0  13AB  8807        MOVL    #BUFFER_SIZE,R9         ; do all pages
               00002134'EF    16  13B2  8808        JSB     CLEAR_BUFFER            ; go clear buffers
                        13B8  8809                                                ; send read command
          54   FFFB6C20 8F    D0  13B8  8810        MOVL    #DELAY_TIME1,R4         ; load send packet delay time
                    55    93  13BF  8811        MOVAL   @(R3)+,R5               ; point to read command packet
                    57    0E  13C2  8812        MOVL    #14,R7                  ; load transfer byte count
               0000203D'EF    16  13C5  8813        JSB     SEND_TU58               ; send command packet
        24 00000000'EF    00    E1  13CB  8814        BBC     #V_CLOCK_FLAG,B_FLAGS,190$ ; br = no timeout error
                        13D3  8815        $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=NO_READY
               00001BEB'EF    DF  13D3                PUSHAL  NO_READY
               00001931'EF    DF  13D9                PUSHAL  T_RD_REC_ERR
                         00    DD  13DF                PUSHL   #0
                         07    DD  13E1                PUSHL   #$ER
                        13E3        ;;; TEST 12, SUBTEST 9, ERROR 7
          000100D0 9F    04    FB  13E3                CALLS   #$$M, a#DS$ERRHARD
                        13EA  8816        $DS_BNCOMPLETE  180$
                   03 50    E9  13EA                BLBC    R0, 180$
                        13ED  8817        $DS_ABORT       TEST
                         50    D4  13ED                CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                         04    13EF                RET                             ; TERMINATE TEST
                        13F0  8818 180$:   $DS_ABORT
          00010020 9F    6C    FA  13F0                CALLG   (AP), a#DS$ABORT
                        13F7  8819                                                ; read data and end packets
          54   FFF3CB00 8F    D0  13F7  8820 190$:   MOVL    #DELAY_TIME3,R4         ; load receive packet delay time
          55   00000000'FF    9E  13FE  8821        MOVAB   @A_BUFFER_BEGIN,R5      ; load buffer address to store data
    57    55   00000092 8F    C1  1405  8822        ADDL3   #146,R5,R7              ; load last expected address of data
               000020C8'EF    16  140D  8823        JSB     MRECEIVE_TU58           ; go get data from TU58
          5B   00000000'FF    9E  1413  8824        MOVAB   @A_BUFFER_BEGIN,R11     ; load address of actual data
                    5A    93  141A  8825        MOVAL   @(R3)+,R10              ; load address of expected data
                    57    55  141D  8826        CMPL    R5,R7                   ; check for correct number of bytes
                         31    13  1420  8827        BEQL    230$                    ; br = correct number of bytes
          00000000'EF    04    88  1422  8828        BISB2   #M_DATA_FLAG,B_FLAGS    ; set data error flag
                        1429  8829 195$:   $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=REC_ERR,-
                        1429  8830                        P1=#T_REC_DATA
               00001D68'8F    DD  1429                PUSHL   #T_REC_DATA
               00001EB4'EF    DF  142F                PUSHAL  REC_ERR
               00001931'EF    DF  1435                PUSHAL  T_RD_REC_ERR
                         00    DD  143B                PUSHL   #0
                         08    DD  143D                PUSHL   #$ER
                        143F        ;;; TEST 12, SUBTEST 9, ERROR 8
          000100D0 9F    05    FB  143F                CALLS   #$$M, a#DS$ERRHARD
                        1446  8831        $DS_BNCOMPLETE  200$
                   03 50    E9  1446                BLBC    R0, 200$
                        1449  8832        $DS_ABORT       TEST
                         50    D4  1449                CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
```

```
                      04  144B                       RET                         ; TERMINATE TEST
                          144C  8833
                          144C  8834 200$:    $DS_ABORT
00010020 9F   6C    FA    144C                       CALLG   (AP), a#DS$ABORT
                          1453  8835                                            ; check data packet
5C   00000084 8F    D0    1453  8836 230$:    MOVL    #132,R12                  ; load number of bytes to check
                          145A  8837 240$:    $DS_BREAK
00010058 9F   6E    FA    145A                       CALLG   (SP), a#DS$BREAK
     0000213B'EF    16    1461  8838          JSB     CHECK_PACKET              ; go check data packet
                          1467  8839          $DS_BNCOMPLETE  260$              ; br = no error
               24 50    E9    1467                       BLBC    R0, 260$
                          146A  8840          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=DATA_ERR_DATA
     00001E75'EF    DF    146A                       PUSHAL  DATA_ERR_DATA
     00001931'EF    DF    1470                       PUSHAL  T_RD_REC_ERR
                00  DD    1476                       PUSHL   #0
                09  DD    1478                       PUSHL   #$ER
                          147A        ;;; TEST 12, SUBTEST 9, ERROR 9
000100D0 9F   04    FB    147A                       CALLS   #$$M, a#DS$ERRHARD
                          1481  8841          $DS_BNCOMPLETE  250$
            03 50    E9    1481                       BLBC    R0, 250$
                          1484  8842          $DS_ABORT       TEST
                50  D4    1484                       CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                04  1486                       RET                         ; TERMINATE TEST
                          1487  8843 250$:    $DS_ABORT
00010020 9F   6C    FA    1487                       CALLG   (AP), a#DS$ABORT
                          148E  8844                                            ; check end packet
5B   00000084 8F    C0    148E  8845 260$:    ADDL2   #132,R11                  ; adjust pointer to next packet
          5A  93    DE    1495  8846          MOVAL   a(R3)+,R10                ; load address of expected end packet
          5C  0E    D0    1498  8847          MOVL    #14,R12                   ; load number of bytes to check
                          149B  8848          $DS_BREAK
00010058 9F   6E    FA    149B                       CALLG   (SP), a#DS$BREAK
     0000213B'EF    16    14A2  8849          JSB     CHECK_PACKET              ; go check end packet
                          14A8  8850          $DS_BNCOMPLETE  270$              ; br = no error
               24 50    E9    14A8                       BLBC    R0, 270$
                          14AB  8851          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=DATA_ERR_END
     00001E9D'EF    DF    14AB                       PUSHAL  DATA_ERR_END
     00001931'EF    DF    14B1                       PUSHAL  T_RD_REC_ERR
                00  DD    14B7                       PUSHL   #0
                0A  DD    14B9                       PUSHL   #$ER
                          14BB        ;;; TEST 12, SUBTEST 9, ERROR 10
000100D0 9F   04    FB    14BB                       CALLS   #$$M, a#DS$ERRHARD
                          14C2  8852          $DS_BNCOMPLETE  265$
            03 50    E9    14C2                       BLBC    R0, 265$
                          14C5  8853          $DS_ABORT       TEST
                50  D4    14C5                       CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                04  14C7                       RET                         ; TERMINATE TEST
                          14C8  8854 265$:    $DS_ABORT
00010020 9F   6C    FA    14C8                       CALLG   (AP), a#DS$ABORT
FEC5 00000004'EF    01    01    9D    14CF  8855 270$:    ACBB    #1,#1,B_COUNT1,170$       ; br = not finished reading
                          14D9  8856
                          14D9  8857
                          14D9  8858
                          14D9  8859
                          14D9  8860          $DS_ENDSUB
                          14D9        T12_S9_X:
```

```
00010038 9F   00000150'EF   FA  14D9                    CALLG   $S$, a#DS$ENDSUB
                            14E4  8861
                            14E4  8862          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 12.10:  BLOCK WRITE - READ
14E4  8865 ;+
14E4  8866 ; SUBTEST DESCRIPTION:
14E4  8867 ;
14E4  8868 ;       This subtest sends the TU58 controller a series of command packets
14E4  8869 ;       that will cause head switches, forward seeks, reverse seeks and
14E4  8870 ;       seeks with head switches during read and write operations on
14E4  8871 ;       blocks. All data written is read and checked. All end packets
14E4  8872 ;       are checked as the subtest progresses. If any errors occur they are
14E4  8873 ;       reported.
14E4  8874 ;
14E4  8875 ;
14E4  8876 ; SUBTEST STEPS:
14E4  8877 ;
14E4  8878 ;       SUBTEST BLOCK WRITE - READ
14E4  8879 ;       :  DO for count = 1 to 5
14E4  8880 ;       :  :  Point to write command packet
14E4  8881 ;       :  :  Clear buffer
14E4  8882 ;       :  :  REPEAT
14E4  8883 ;       :  :  :  Send command packet byte at a time
14E4  8884 ;       :  :  :  Set timer
14E4  8885 ;       :  :  :  IF timer expired AND no response
14E4  8886 ;       :  :  :  :  THEN
14E4  8887 ;       :  :  :  :  Report no response error
14E4  8888 ;       :  :  :  :  Exit test
14E4  8889 ;       :  :  :  ENDIF
14E4  8890 ;       :  :  : UNTIL all bytes sent
14E4  8891 ;       :  :  ENDREPEAT
14E4  8892 ;       :  :  DO for count = 1 to 4
14E4  8893 ;       :  :  :  Wait for continue
14E4  8894 ;       :  :  :  Set timer
14E4  8895 ;       :  :  :  IF timer expired AND no continue
14E4  8896 ;       :  :  :  :  THEN
14E4  8897 ;       :  :  :  :  Report no continue error
14E4  8898 ;       :  :  :  :  Exit test
14E4  8899 ;       :  :  :  ENDIF
14E4  8900 ;       :  :  :  Point to data packet
14E4  8901 ;       :  :  :  REPEAT
14E4  8902 ;       :  :  :  :  Send data packet byte at a time
14E4  8903 ;       :  :  :  :  Set timer
14E4  8904 ;       :  :  :  :  IF timer expired AND no response
14E4  8905 ;       :  :  :  :  :  THEN
14E4  8906 ;       :  :  :  :  :  Report no response error
14E4  8907 ;       :  :  :  :  :  Exit test
14E4  8908 ;       :  :  :  :  ENDIF
14E4  8909 ;       :  :  :  : UNTIL all bytes sent
14E4  8910 ;       :  :  :  ENDREPEAT
14E4  8911 ;       :  :  ENDDO
14E4  8912 ;       :  :  REPEAT
14E4  8913 ;       :  :  :  Set timer
14E4  8914 ;       :  :  :  IF timer expired AND done set
14E4  8915 ;       :  :  :  :  THEN
14E4  8916 ;       :  :  :  :  :  Read byte
14E4  8917 ;       :  :  :  ENDIF
14E4  8918 ;       :  :  : UNTIL timer expired AND done clear
```

```
14E4  8919 ;        :   :  ENDREPEAT
14E4  8920 ;        :   :  IF expected byte count NEQ actual byte count
14E4  8921 ;        :   :  : THEN
14E4  8922 ;        :   :  :  : Report error
14E4  8923 ;        :   :  :  : Exit test
14E4  8924 ;        :   :  ENDIF
14E4  8925 ;        :   :  REPEAT
14E4  8926 ;        :   :  :  Point to expected end packet
14E4  8927 ;        :   :  :  IF expected end data NEQ received end data
14E4  8928 ;        :   :  :  : THEN
14E4  8929 ;        :   :  :  : Report end packet data error
14E4  8930 ;        :   :  :  ENDIF
14E4  8931 ;        :   :  : UNTIL all data checked
14E4  8932 ;        :   :  ENDREPEAT
14E4  8933 ;        :   :  Point to read command packet
14E4  8934 ;        :   :  REPEAT
14E4  8935 ;        :   :  :  Send command packet byte at a time
14E4  8936 ;        :   :  :  Set timer
14E4  8937 ;        :   :  :  IF timer expired and no response
14E4  8938 ;        :   :  :  : THEN
14E4  8939 ;        :   :  :  : Report no response error
14E4  8940 ;        :   :  :  : Exit test
14E4  8941 ;        :   :  :  ENDIF
14E4  8942 ;        :   :  : UNTIL all bytes sent
14E4  8943 ;        :   :  ENDREPEAT
14E4  8944 ;        :   :  REPEAT
14E4  8945 ;        :   :  :  Set timer
14E4  8946 ;        :   :  :  IF timer expired AND done set
14E4  8947 ;        :   :  :  : THEN
14E4  8948 ;        :   :  :  : : Read byte
14E4  8949 ;        :   :  :  ENDIF
14E4  8950 ;        :   :  : UNTIL timer expired AND done clear
14E4  8951 ;        :   :  ENDREPEAT
14E4  8952 ;        :   :  IF expected byte count NEQ actual byte count
14E4  8953 ;        :   :  :  THEN
14E4  8954 ;        :   :  :  : Report error
14E4  8955 ;        :   :  :  : Exit test
14E4  8956 ;        :   :  ENDIF
14E4  8957 ;        :   :  REPEAT
14E4  8958 ;        :   :  :  Point to expected data packet
14E4  8959 ;        :   :  :  REPEAT
14E4  8960 ;        :   :  :  :  IF data expected NEQ data received
14E4  8961 ;        :   :  :  :  : THEN
14E4  8962 ;        :   :  :  :  : Report data error
14E4  8963 ;        :   :  :  :  : Exit subtest
14E4  8964 ;        :   :  :  :  ENDIF
14E4  8965 ;        :   :  :  :  Point to next byte of data
14E4  8966 ;        :   :  :  : UNTIL all data in packet checked
14E4  8967 ;        :   :  :  ENDREPEAT
14E4  8968 ;        :   :  : UNTIL 4 data packets checked
14E4  8969 ;        :   :  ENDREPEAT
14E4  8970 ;        :   :  Point to expected end packet
14E4  8971 ;        :   :  REPEAT
14E4  8972 ;        :   :  :  IF data expected NEQ data received
14E4  8973 ;        :   :  :  : THEN
```

```
                          14E4  8974 ;       :  :  :  : Report data error
                          14E4  8975 ;       :  :  :  : Exit subtest
                          14E4  8976 ;       :  :  : ENDIF
                          14E4  8977 ;       :  :  : UNTIL all end packet bytes checked
                          14E4  8978 ;       :  :  ENDREPEAT
                          14E4  8979 ;       :  ENDDO
                          14E4  8980 ;       ENDSUBTEST BLOCK WRITE - READ
                          14E4  8981 ;
                          14E4  8982 ;
                          14E4  8983 ;.page
                          14E4  8984 ;-
                          14E4  8985         $DS_BGNSUB
                          14E4       T12_S10::
00010030 9F   0000015C'EF FA 14E4                CALLG   $S$, a#DS$BGNSUB
         00000001'EF  94   14EF  8986            CLRB    B_FLAGS2                ; initialize repeat flag
   00000001'EF   06  88   14F5  8987            BISB2   #<M_REPEAT_SEND+M_REPEAT_CHECK>,B_FLAGS2
         00000004'EF  94   14FC  8988            CLRB    B_COUNT1                ; initialize command counter
      53 0000165B'EF  9E   1502  8989            MOVAB   MCOMMAND_TBL_3,R3       ; load pointer to command table
                      1509  8990                                                    ; clear buffers
         00000000'EF  94   1509  8991 10$:       CLRB    B_FLAGS                 ; initialize flags
      58 00000000'FF  9E   150F  8992            MOVAB   aA_BUFFER_BEGIN,R8      ; load buffer starting address
      59 00000600 8F  D0   1516  8993            MOVL    #BUFFER_SIZE,R9         ; do all pages
         00002134'EF  16   151D  8994            JSB     CLEAR_BUFFER            ; go clear buffers
                      1523  8995                                                    ; send write command
      54 FFF3CB00 8F  D0   1523  8996            MOVL    #DELAY_TIME3,R4         ; load send packet delay time
            55    93  DE   152A  8997            MOVAL   a(R3)+,R5               ; point to write command packet
            57    0E  D0   152D  8998            MOVL    #14,R7                  ; load transfer byte count
         0000203D'EF  16   1530  8999            JSB     SEND_TU58               ; send command packet
24 00000000'EF   00  E1   1536  9000            BBC     #V_CLOCK_FLAG,B_FLAGS,30$ ; br = no timeout error
                      153E  9001            $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=NO_READY
         00001BEB'EF  DF   153E                          PUSHAL  NO_READY
         000018C8'EF  DF   1544                          PUSHAL  T_WR_BLK_ERR
                  00  DD   154A                          PUSHL   #0
                  01  DD   154C                          PUSHL   #$ER
                      154E        ;;; TEST 12, SUBTEST 10, ERROR 1
000100D0 9F   04  FB   154E                          CALLS   #$$M, a#DS$ERRHARD
                      1555  9002            $DS_BNCOMPLETE  20$
            03 50  E9   1555                          BLBC    R0, 20$
                      1558  9003            $DS_ABORT       TEST
               50  D4   1558                          CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                   04   155A                          RET                         ; TERMINATE TEST
                      155B  9004 20$:       $DS_ABORT
00010020 9F   6C  FA   155B                          CALLG   (AP), a#DS$ABORT
                      1562  9005                                                    ; read continue
         00000003'EF  94   1562  9006 30$:       CLRB    B_COUNT                 ; initialize data packet counter
   54    FF7E4CE0 8F  D0   1568  9007 35$:       MOVL    #DELAY_TIME7,R4         ; load receive packet delay time
   55    00000000'FF  9E   156F  9008            MOVAB   aA_BUFFER_BEGIN,R5      ; load buffer address to store data
      57    55   01  C1   1576  9009            ADDL3   #1,R5,R7                ; load last expected address of data
         000020C8'EF  16   157A  9010            JSB     MRECEIVE_TU58           ; go get data from TU58
   5A    00000023'EF  9E   1580  9011            MOVAB   B_CONTINUE,R10          ; load address of expected continue
   5B    00000000'FF  9E   1587  9012            MOVAB   aA_BUFFER_BEGIN,R11     ; load address of buffer
            57   55  D1   158E  9013            CMPL    R5,R7                   ; check for correct number of bytes
                  2A  13   1591  9014            BEQL    70$                     ; br = correct number of bytes
                      1593  9015 37$:       $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=REC_ERR,-
                      1593  9016                          P1=#T_REC_CONT
```

```
                00001D47'8F    DD  1593                        PUSHL   #T_REC_CONT
                00001EB4'EF    DF  1599                        PUSHAL  REC_ERR
                000018C8'EF    DF  159F                        PUSHAL  T_WR_BLK_ERR
                          00   DD  15A5                        PUSHL   #0
                          02   DD  15A7                        PUSHL   #$ER
                               15A9        ;;; TEST 12, SUBTEST 10, ERROR 2
              000100D0 9F      05  FB  15A9                    CALLS   #$$M, a#DS$ERRHARD
                               15B0  9017          $DS_BNCOMPLETE  40$
                       03 50   E9  15B0                        BLBC    R0, 40$
                               15B3  9018          $DS_ABORT       TEST
                          50   D4  15B3                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                          04   15B5                            RET                         ; TERMINATE TEST
                               15B6  9019
                               15B6  9020 40$:     $DS_ABORT
              00010020 9F      6C  FA  15B6                    CALLG   (AP), a#DS$ABORT
                               15BD  9021                                                  ; check continue
                       5C   01 D0  15BD  9022 70$:     MOVL    #1,R12                      ; load number of bytes to check
                               15C0  9023          $DS_BREAK
              00010058 9F      6E  FA  15C0                    CALLG   (SP), a#DS$BREAK
                   0000213B'EF    16  15C7  9024          JSB     CHECK_PACKET            ; go check continue
                               15CD  9025          $DS_BNCOMPLETE  90$                     ; br = no error
                       24 50   E9  15CD                        BLBC    R0, 90$
                               15D0  9026          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=DATA_ERR_CONT
                00001E4D'EF    DF  15D0                        PUSHAL  DATA_ERR_CONT
                000018C8'EF    DF  15D6                        PUSHAL  T_WR_BLK_ERR
                          00   DD  15DC                        PUSHL   #0
                          03   DD  15DE                        PUSHL   #$ER
                               15E0        ;;; TEST 12, SUBTEST 10, ERROR 3
              000100D0 9F      04  FB  15E0                    CALLS   #$$M, a#DS$ERRHARD
                               15E7  9027          $DS_BNCOMPLETE  80$
                       03 50   E9  15E7                        BLBC    R0, 80$
                               15EA  9028          $DS_ABORT       TEST
                          50   D4  15EA                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                          04   15EC                            RET                         ; TERMINATE TEST
                               15ED  9029 80$:     $DS_ABORT
              00010020 9F      6C  FA  15ED                    CALLG   (AP), a#DS$ABORT
                               15F4  9030                                                  ; send data packet
           54 FFFB6C20 8F      D0  15F4  9031 90$:     MOVL    #DELAY_TIME1,R4             ; load send packet delay time
                    55     93  DE  15FB  9032          MOVAL   a(R3)+,R5                   ; point to data packet
           57 00000084 8F      D0  15FE  9033          MOVL    #132,R7                     ; load transfer byte count
                00002030'EF    16  1605  9034          JSB     SEND_TU58                   ; send data packet
        24 00000000'EF      00  E1  160B  9035          BBC     #V_CLOCK_FLAG,B_FLAGS,110$ ; br = no timeout error
                               1613  9036          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=NO_READY
                00001BEB'EF    DF  1613                        PUSHAL  NO_READY
                000018C8'EF    DF  1619                        PUSHAL  T_WR_BLK_ERR
                          00   DD  161F                        PUSHL   #0
                          04   DD  1621                        PUSHL   #$ER
                               1623        ;;; TEST 12, SUBTEST 10, ERROR 4
              000100D0 9F      04  FB  1623                    CALLS   #$$M, a#DS$ERRHARD
                               162A  9037          $DS_BNCOMPLETE  100$
                       03 50   E9  162A                        BLBC    R0, 100$
                               162D  9038          $DS_ABORT       TEST
                          50   D4  162D                        CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                          04   162F                            RET                         ; TERMINATE TEST
                               1630  9039 100$:     $DS_ABORT
```

```
                00010020 9F   6C    FA  1630                        CALLG   (AP), a#DS$ABORT
                                    1637  9040
                     00000000'FF    94  1637  9041 110$:    CLRB    aA_BUFFER_BEGIN          ; clear buffer used to store continue
    FF21 00000003'EF    01    03    9D  163D  9042           ACBB    #3,#1,B_COUNT,35$        ; br = not finished
              10 00000001'EF    01    E1  1647  9043 112$:    BBC     #V_REPEAT_SEND,B_FLAGS2,115$ ; br =  not repeating
                     00000003'EF    94  164F  9044           CLRB    B_COUNT                  ; initialize counter to repeat
                00000001'EF    02    8A  1655  9045           BICB2   #M_REPEAT_SEND,B_FLAGS2  ; init repeat flag to stop repeating
                           FF09    31  165C  9046           BRW     35$                      ; finish sending data
                                       165F  9047                                            ; read end packet
                54   FFE17B80 8F    D0  165F  9048 115$:    MOVL    #DELAY_TIME5,R4          ; load receive packet delay time
                55   00000000'FF    9E  1666  9049           MOVAB   aA_BUFFER_BEGIN,R5       ; load buffer address to store data
                     57   55    0E    C1  166D  9050           ADDL3   #14,R5,R7                ; load last expected address of data
                      000020C8'EF    16  1671  9051           JSB     MRECEIVE_TU58            ; go get data from TU58
                          5A    93    DE  1677  9052           MOVAL   a(R3)+,R10               ; load address of expected end packet
                5B   00000000'FF    9E  167A  9053           MOVAB   aA_BUFFER_BEGIN,R11      ; load address of actual end packet
                          57    55    D1  1681  9054           CMPL    R5,R7                    ; check for correct number of bytes
                                31    13  1684  9055           BEQL    150$                     ; br = correct number of bytes
                00000000'EF    08    88  1686  9056           BISB2   #M_END_FLAG,B_FLAGS      ; set end error flag
                                       168D  9057 117$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=REC_ERR,-
                                       168D  9058                      P1=#T_REC_END
                     00001D2E'8F    DD  168D                        PUSHL   #T_REC_END
                     00001EB4'EF    DF  1693                        PUSHAL  REC_ERR
                      000018C8'EF    DF  1699                        PUSHAL  T_WR_BLK_ERR
                                00    DD  169F                        PUSHL   #0
                                05    DD  16A1                        PUSHL   #$ER
                                       16A3        ;;; TEST 12, SUBTEST 10, ERROR 5
                00010DD0 9F    05    FB  16A3                        CALLS   #$$M, a#DS$ERRHARD
                                       16AA  9059          $DS_BNCOMPLETE  120$
                          03 50    E9  16AA                        BLBC    R0, 120$
                                       16AD  9060          $DS_ABORT       TEST
                                50    D4  16AD                        CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                                04    16AF                        RET                      ; TERMINATE TEST
                                       16B0  9061
                                       16B0  9062 120$:    $DS_ABORT
                00010020 9F    6C    FA  16B0                        CALLG   (AP), a#DS$ABORT
                                       16B7  9063                                            ; check end packet
                          5C    0E    D0  16B7  9064 150$:    MOVL    #14,R12                  ; load number of bytes to check
                                       16BA  9065          $DS_BREAK
                00010058 9F    6E    FA  16BA                        CALLG   (SP), a#DS$BREAK
                     0000213B'EF    16  16C1  9066          JSB     CHECK_PACKET             ; go check end packet
                                       16C7  9067          $DS_BNCOMPLETE  160$             ; br = no error
                          24 50    E9  16C7                        BLBC    R0, 160$
                                       16CA  9068          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_BLK_ERR,PRLINK=DATA_ERR_END
                     00001E9D'EF    DF  16CA                        PUSHAL  DATA_ERR_END
                     000018C8'EF    DF  16D0                        PUSHAL  T_WR_BLK_ERR
                                00    DD  16D6                        PUSHL   #0
                                06    DD  16D8                        PUSHL   #$ER
                                       16DA        ;;; TEST 12, SUBTEST 10, ERROR 6
                00010DD0 9F    04    FB  16DA                        CALLS   #$$M, a#DS$ERRHARD
                                       16E1  9069          $DS_BNCOMPLETE  155$
                          03 50    E9  16E1                        BLBC    R0, 155$
                                       16E4  9070          $DS_ABORT       TEST
                                50    D4  16E4                        CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                                04    16E6                        RET                      ; TERMINATE TEST
                                       16E7  9071 155$:    $DS_ABORT
```

```
                00010020 9F   6C   FA  16E7                        CALLG   (AP), a#DS$ABORT
                                       16EE  9072                                        ; clear buffers
                     00000000'EF   94  16EE  9073 160$:    CLRB    B_FLAGS                ; initialize flags
                58   00000000'FF   9E  16F4  9074          MOVAB   aB_BUFFER_BEGIN,R8     ; load buffer starting address
                59   00000600 8F   D0  16FB  9075          MOVL    #BUFFER_SIZE,R9        ; do all pages
                     00002134'EF   16  1702  9076          JSB     CLEAR_BUFFER           ; go clear buffers
                                       1708  9077                                        ; send read command
                54   FFFB6C20 8F   D0  1708  9078          MOVL    #DELAY_TIME1,R4        ; load send packet delay time
                          55   93   DE  170F  9079          MOVAL   a(R3)+,R5              ; point to read command packet
                          57   0E   D0  1712  9080          MOVL    #14,R7                 ; load transfer byte count
                     0000203D'EF   16  1715  9081          JSB     SEND_TU58              ; send command packet
                24 00000000'EF   00   E1  171B  9082          BBC     #V_CLOCK_FLAG,B_FLAGS,190$ ; br = no timeout error
                                       1723  9083          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=NO_READY
                     00001BEB'EF   DF  1723                        PUSHAL  NO_READY
                     000018EB'EF   DF  1729                        PUSHAL  T_RD_BLK_ERR
                               00   DD  172F                        PUSHL   #0
                               07   DD  1731                        PUSHL   #$ER
                                       1733      ;;; TEST 12, SUBTEST 10, ERROR 7
                00010020 9F   6C   FA  1740                        CALLG   (AP), a#DS$ABORT
                                       1747  9087                                        ; read data and end packets
                54   FFF3CB00 8F   D0  1747  9088 190$:    MOVL    #DELAY_TIME3,R4        ; load receive packet delay time
                55   00000000'FF   9E  174E  9089          MOVAB   aA_BUFFER_BEGIN,R5     ; load buffer address to store data
             57 55   00000210 8F   C1  1755  9090          ADDL3   #528,R5,R7             ; load last expected address of data
          07 00000001'EF   02   E1  175D  9091          BBC     #V_REPEAT_CHECK,B_FLAGS2,195$ ; br = not repeating
                57   00000210 8F   C0  1765  9092          ADDL2   #528,R7                ; must double buffer if repeating
                          57   0C   C0  176C  9093 195$:    ADDL2   #14,R7                 ; make last address include end packet
                     000020C8'EF   16  176F  9094          JSB     MRECEIVE_TU58          ; go get data from TU58
                5B   00000000'FF   9E  1775  9095          MOVAB   aA_BUFFER_BEGIN,R11    ; load address of actual data
                          5A   93   DE  177C  9096          MOVAL   a(R3)+,R10             ; load address of expected data
                          57   55   D1  177F  9097          CMPL    R5,R7                  ; check for correct number of bytes
                               31   13  1782  9098          BEQL    230$                   ; br = correct number of bytes
                00000000'EF   04   88  1784  9099          BISB2   #M_DATA_FLAG,B_FLAGS   ; set data error flag
                                       178B  9100 197$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=REC_ERR,-
                                       178B  9101                        P1=#T_REC_DATA
                     00001D68'8F   DD  178B                        PUSHL   #T_REC_DATA
                     00001EB4'EF   DF  1791                        PUSHAL  REC_ERR
                     000018EB'EF   DF  1797                        PUSHAL  T_RD_BLK_ERR
                               00   DD  179D                        PUSHL   #0
                               08   DD  179F                        PUSHL   #$ER
                                       17A1      ;;; TEST 12, SUBTEST 10, ERROR 8
                00010020 9F   6C   FA  17A1                        CALLG   (AP), a#DS$ABORT
                                       17A8  9102          $DS_BNCOMPLETE  200$
                          03   50   E9  17A8                        BLBC    R0, 200$
                                       17AB  9103          $DS_ABORT       TEST
                               50   D4  17AB                        CLRL    R0             ; SEND A WARNING TO THE SUPERVISOR
                               04   17AD                        RET                    ; TERMINATE TEST
                                       17AE  9104
                                       17AE  9105 200$:    $DS_ABORT
```

```
                00010020 9F    6C    FA  17AE                        CALLG   (AP), a#DS$ABORT
                                     17B5  9106                                ; check data packets
                     00000006'EF    D4  17B5  9107 230$:   CLRL    L_COUNT                 ; clear counter to check 4 packets
                5C   00000084 8F    D0  17BB  9108         MOVL    #132,R12                ; load number of bytes to check
                                     17C2  9109 240$:   $DS_BREAK
                00010058 9F    6E    FA  17C2                        CALLG   (SP), a#DS$BREAK
                     0000213B'EF    16  17C9  9110         JSB     CHECK_PACKET            ; go check data packet
                                     17CF  9111         $DS_BNCOMPLETE  260$             ; br = no error
                           24 50    E9  17CF                        BLBC    R0, 260$
                                     17D2  9112         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=DATA_ERR_DATA
                     00001E75'EF    DF  17D2                        PUSHAL  DATA_ERR_DATA
                     000018EB'EF    DF  17D8                        PUSHAL  T_RD_BLK_ERR
                           00       DD  17DE                        PUSHL   #0
                           09       DD  17E0                        PUSHL   #$ER
                                    17E2        ;;; TEST 12, SUBTEST 10, ERROR 9
                000100D0 9F    04    FB  17E2                        CALLS   #$$M, a#DS$ERRHARD
                                    17E9  9113         $DS_BNCOMPLETE  250$
                           03 50    E9  17E9                        BLBC    R0, 250$
                                    17EC  9114         $DS_ABORT       TEST
                           50       D4  17EC                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                                    04  17EE                        RET                     ; TERMINATE TEST
                                    17EF  9115 250$:   $DS_ABORT
                00010020 9F    6C    FA  17EF                        CALLG   (AP), a#DS$ABORT
                5B   00000084 8F    C0  17F6  9116 260$:   ADDL2   #132,R11                ; adjust pointer to next packet
                        5A     93    DE  17FD  9117         MOVAL   a(R3)+,R10              ; load address of expected data
             BA 00000006'EF    03    F3  1800  9118         AOBLEQ  #3,L_COUNT,240$         ; br = not finished checking data
             0F 00000001'EF    02    E1  1808  9119         BBC     #V_REPEAT_CHECK,B_FLAGS2,265$ ; br = not repeating
                     00000006'EF    D4  1810  9120         CLRL    L_COUNT                 ; initialize check counter
                     00000001'EF    94  1816  9121         CLRB    B_FLAGS2                ; clear repeat flag to stop repeating
                           FFA3     31  181C  9122         BRW     240$                    ; check rest of data packets
                                    181F  9123                                          ; check end packet
                           5C   0E  D0  181F  9124 265$:   MOVL    #14,R12                 ; load number of bytes to check
                                    1822  9125         $DS_BREAK
                00010058 9F    6E    FA  1822                        CALLG   (SP), a#DS$BREAK
                     0000213B'EF    16  1829  9126         JSB     CHECK_PACKET            ; go check end packet
                                    182F  9127         $DS_BNCOMPLETE  275$             ; br = no error
                           24 50    E9  182F                        BLBC    R0, 275$
                                    1832  9128         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_BLK_ERR,PRLINK=DATA_ERR_END
                     00001E9D'EF    DF  1832                        PUSHAL  DATA_ERR_END
                     000018EB'EF    DF  1838                        PUSHAL  T_RD_BLK_ERR
                           00       DD  183E                        PUSHL   #0
                           0A       DD  1840                        PUSHL   #$ER
                                    1842        ;;; TEST 12, SUBTEST 10, ERROR 10
                000100D0 9F    04    FB  1842                        CALLS   #$$M, a#DS$ERRHARD
                                    1849  9129         $DS_BNCOMPLETE  270$
                           03 50    E9  1849                        BLBC    R0, 270$
                                    184C  9130         $DS_ABORT       TEST
                           50       D4  184C                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                                    04  184E                        RET                     ; TERMINATE TEST
                                    184F  9131 270$:   $DS_ABORT
                00010020 9F    6C    FA  184F                        CALLG   (AP), a#DS$ABORT
          FCA9 00000004'EF    01    04  9D  1856  9132 275$:   ACBB    #4,#1,B_COUNT1,10$      ; br = not finished executing test
                                    1860  9133
                                    1860  9134
                                    1860  9135         $DS_ENDSUB
```

```
                        1860        T12_S10_X:
00010038 9F   0000015C'EF   FA  1860                    CALLG   $S$, a#DS$ENDSUB
                            186B  9136
                            186B  9137          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 12.11:   RECORD WRITE - READ
                ;+
                ; SUBTEST DESCRIPTION:
                ;
                ;       This subtest sends the TU58 controller a series of command packets
                ;       that will cause head switches, forward seeks, reverse seeks and
                ;       seeks with head switches durring read and write operations on
                ;       records. All data written is read and checked. All end packets
                ;       are checked as the subtest progresses. If any errors occur they are
                ;       reported.
                ;
                ;
                ; SUBTEST STEPS:
                ;
                ;       SUBTEST RECORD WRITE - READ
                ;       :  DO for count = 1 to 5
                ;       :  :  Point to write command packet
                ;       :  :  Clear buffer
                ;       :  :  REPEAT
                ;       :  :  :  Send command packet byte at a time
                ;       :  :  :  Set timer
                ;       :  :  :  IF timer expired AND no response
                ;       :  :  :  :  THEN
                ;       :  :  :  :  Report no response error
                ;       :  :  :  :  Exit test
                ;       :  :  :  ENDIF
                ;       :  :  : UNTIL all bytes sent
                ;       :  :  ENDREPEAT
                ;       :  :  DO for count = 1 to 2
                ;       :  :  :  Wait for continue
                ;       :  :  :  Set timer
                ;       :  :  :  IF timer expired AND no continue
                ;       :  :  :  :  THEN
                ;       :  :  :  :  Report no continue error
                ;       :  :  :  :  Exit test
                ;       :  :  :  ENDIF
                ;       :  :  :  Point to data packet
                ;       :  :  :  REPEAT
                ;       :  :  :  :  Send data packet byte at a time
                ;       :  :  :  :  Set timer
                ;       :  :  :  :  IF timer expired AND no response
                ;       :  :  :  :  :  THEN
                ;       :  :  :  :  :  Report no response error
                ;       :  :  :  :  :  Exit test
                ;       :  :  :  :  ENDIF
                ;       :  :  :  : UNTIL all bytes sent
                ;       :  :  :  ENDREPEAT
                ;       :  :  ENDDO
                ;       :  :  REPEAT
                ;       :  :  :  Set timer
                ;       :  :  :  IF timer expired AND done set
                ;       :  :  :  :  THEN
                ;       :  :  :  :  :  Read byte
                ;       :  :  :  ENDIF
                ;       :  :  : UNTIL timer expired AND done clear
```

```
186B  9194 ;        :  :  ENDREPEAT
186B  9195 ;        :  :  IF expected byte count NEQ actual byte count
186B  9196 ;        :  :  :  THEN
186B  9197 ;        :  :  :  :  Report error
186B  9198 ;        :  :  :  :  Exit test
186B  9199 ;        :  :  ENDIF
186B  9200 ;        :  :  REPEAT
186B  9201 ;        :  :  :  Point to expected end packet
186B  9202 ;        :  :  :  IF expected end data NEQ received end data
186B  9203 ;        :  :  :  :  THEN
186B  9204 ;        :  :  :  :  Report end packet data error
186B  9205 ;        :  :  :  ENDIF
186B  9206 ;        :  :  : UNTIL all data checked
186B  9207 ;        :  :  ENDREPEAT
186B  9208 ;        :  :  Point to read command packet
186B  9209 ;        :  :  REPEAT
186B  9210 ;        :  :  :  Send command packet byte at a time
186B  9211 ;        :  :  :  Set timer
186B  9212 ;        :  :  :  IF timer expired and no response
186B  9213 ;        :  :  :  :  THEN
186B  9214 ;        :  :  :  :  Report no response error
186B  9215 ;        :  :  :  :  Exit test
186B  9216 ;        :  :  :  ENDIF
186B  9217 ;        :  :  : UNTIL all bytes sent
186B  9218 ;        :  :  ENDREPEAT
186B  9219 ;        :  :  REPEAT
186B  9220 ;        :  :  :  Set timer
186B  9221 ;        :  :  :  IF timer expired AND done set
186B  9222 ;        :  :  :  :  THEN
186B  9223 ;        :  :  :  :  :  Read byte
186B  9224 ;        :  :  :  ENDIF
186B  9225 ;        :  :  : UNTIL timer expired AND done clear
186B  9226 ;        :  :  ENDREPEAT
186B  9227 ;        :  :  IF expected byte count NEQ actual byte count
186B  9228 ;        :  :  :  THEN
186B  9229 ;        :  :  :  :  Report error
186B  9230 ;        :  :  :  :  Exit test
186B  9231 ;        :  :  ENDIF
186B  9232 ;        :  :  REPEAT
186B  9233 ;        :  :  :  Point to expected data packet
186B  9234 ;        :  :  :  REPEAT
186B  9235 ;        :  :  :  :  IF data expected NEQ data received
186B  9236 ;        :  :  :  :  :  THEN
186B  9237 ;        :  :  :  :  :  Report data error
186B  9238 ;        :  :  :  :  :  Exit subtest
186B  9239 ;        :  :  :  :  ENDIF
186B  9240 ;        :  :  :  :  Point to next byte of data
186B  9241 ;        :  :  :  : UNTIL all data in packet checked
186B  9242 ;        :  :  :  ENDREPEAT
186B  9243 ;        :  :  : UNTIL 4 data packets checked
186B  9244 ;        :  :  ENDREPEAT
186B  9245 ;        :  :  Point to expected end packet
186B  9246 ;        :  :  REPEAT
186B  9247 ;        :  :  :  IF data expected NEQ data received
186B  9248 ;        :  :  :  :  THEN
```

```
                                 186B  9249 ;       :  :  :  :  Report data error
                                 186B  9250 ;       :  :  :  :  Exit subtest
                                 186B  9251 ;       :  :  :  ENDIF
                                 186B  9252 ;       :  :  : UNTIL all end packet bytes checked
                                 186B  9253 ;       :  :  ENDREPEAT
                                 186B  9254 ;       :  ENDDO
                                 186B  9255 ;       ENDSUBTEST RECORD WRITE - READ
                                 186B  9256 ;
                                 186B  9257 ;
                                 186B  9258 ;.page
                                 186B  9259 ;-
                                 186B  9260         $DS_BGNSUB
                                 186B       T12_S11::
00010030 9F   00000168'EF   FA   186B                CALLG   $S$, a#DS$BGNSUB
         00000001'EF   94   1876  9261         CLRB    B_FLAGS2                    ; initialize repeat flag
      00000001'EF   06   88   187C  9262         BISB2   #<M_REPEAT_SEND+M_REPEAT_CHECK>,B_FLAGS2
         00000004'EF   94   1883  9263         CLRB    B_COUNT1                    ; initialize command counter
      53 0000176B'EF   9E   1889  9264         MOVAB   MCOMMAND_TBL_4,R3           ; load pointer to command table
                                 1890  9265                                     ; clear buffers
         00000000'EF   94   1890  9266 10$:    CLRB    B_FLAGS                     ; initialize flags
      58 00000000'FF   9E   1896  9267         MOVAB   @A_BUFFER_BEGIN,R8          ; load buffer starting address
      59 00000600 8F   D0   189D  9268         MOVL    #BUFFER_SIZE,R9             ; do all pages
         00002134'EF   16   18A4  9269         JSB     CLEAR_BUFFER                ; go clear buffers
                                 18AA  9270                                     ; send write command
      54 FFF3CB00 8F   D0   18AA  9271         MOVL    #DELAY_TIME3,R4             ; load send packet delay time
            55   93   DE   18B1  9272         MOVAL   @(R3)+,R5                   ; point to write command packet
            57   0E   D0   18B4  9273         MOVL    #14,R7                      ; load transfer byte count
         0000203D'EF   16   18B7  9274         JSB     SEND_TU58                   ; send command packet
24 00000000'EF   00   E1   18BD  9275         BBC     #V_CLOCK_FLAG,B_FLAGS,30$ ; br = no timeout error
                           18C5  9276         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
         00001BEB'EF   DF   18C5                PUSHAL  NO_READY
         0000190D'EF   DF   18CB                PUSHAL  T_WR_REC_ERR
               00      DD   18D1                PUSHL   #0
               01      DD   18D3                PUSHL   #$ER
                           18D5       ;;; TEST 12, SUBTEST 11, ERROR 1
000100D0 9F   04   FB   18D5                    CALLS   #$$M, a#DS$ERRHARD
                           18DC  9277         $DS_BNCOMPLETE  20$
            03 50   E9   18DC                BLBC    R0, 20$
                           18DF  9278         $DS_ABORT       TEST
               50   D4   18DF                CLRL    R0                          ; SEND A WARNING TO THE SUPERVISOR
                    04   18E1                RET                                 ; TERMINATE TEST
                           18E2  9279 20$:    $DS_ABORT
00010020 9F   6C   FA   18E2                CALLG   (AP), a#DS$ABORT
                           18E9  9280                                     ; read continue
54   FF7E4CE0 8F   D0   18E9  9281 30$:    MOVL    #DELAY_TIME7,R4             ; load receive packet delay time
55   00000000'FF   9E   18F0  9282         MOVAB   @A_BUFFER_BEGIN,R5          ; load buffer address to store data
     57   55   01   C1   18F7  9283         ADDL3   #1,R5,R7                    ; load last expected address of data
         000020C8'EF   16   18FB  9284         JSB     MRECEIVE_TU58               ; go get data from TU58
5A   00000023'EF   9E   1901  9285         MOVAB   B_CONTINUE,R10              ; load address of expected data
5B   00000000'FF   9E   1908  9286         MOVAB   @A_BUFFER_BEGIN,R11         ; load address of actual data
            57   55   D1   190F  9287         CMPL    R5,R7                       ; check for correct number of bytes
                  2A   13   1912  9288         BEQL    70$                         ; br = correct number of bytes
                           1914  9289         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                           1914  9290                         P1=#T_REC_CONT
         00001D47'8F   DD   1914                PUSHL   #T_REC_CONT
```

```
                00001EB4'EF   DF  191A                          PUSHAL  REC_ERR
                0000190D'EF   DF  1920                          PUSHAL  T_WR_REC_ERR
                          00  DD  1926                          PUSHL   #0
                          02  DD  1928                          PUSHL   #$ER
                              192A        ;;; TEST 12, SUBTEST 11, ERROR 2
            000100D0 9F   05  FB  192A                          CALLS   #$$M, a#DS$ERRHARD
                              1931  9291          $DS_BNCOMPLETE  40$
                       03 50  E9  1931                          BLBC    R0, 40$
                              1934  9292          $DS_ABORT       TEST
                          50  D4  1934                          CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                          04  1936                              RET                     ; TERMINATE TEST
                              1937  9293
                              1937  9294 40$:     $DS_ABORT
            00010020 9F   6C  FA  1937                          CALLG   (AP), a#DS$ABORT
                              193E  9295                                                  ; check continue
                    5C    01  D0  193E  9296 70$:     MOVL    #1,R12                    ; load number of bytes to check
                              1941  9297          $DS_BREAK
            00010058 9F   6E  FA  1941                          CALLG   (SP), a#DS$BREAK
                0000213B'EF   16  1948  9298          JSB     CHECK_PACKET              ; go check continue
                              194E  9299          $DS_BNCOMPLETE  90$                   ; br = no error
                       24 50  E9  194E                          BLBC    R0, 90$
                              1951  9300          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_CONT
                00001E4D'EF   DF  1951                          PUSHAL  DATA_ERR_CONT
                0000190D'EF   DF  1957                          PUSHAL  T_WR_REC_ERR
                          00  DD  195D                          PUSHL   #0
                          03  DD  195F                          PUSHL   #$ER
                              1961        ;;; TEST 12, SUBTEST 11, ERROR 3
            '000100D0 9F   04  FB  1961                         CALLS   #$$M, a#DS$ERRHARD
                              1968  9301          $DS_BNCOMPLETE  80$
                       03 50  E9  1968                          BLBC    R0, 80$
                              196B  9302          $DS_ABORT       TEST
                          50  D4  196B                          CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                          04  196D                              RET                     ; TERMINATE TEST
                              196E  9303 80$:     $DS_ABORT
            00010020 9F   6C  FA  196E                          CALLG   (AP), a#DS$ABORT
                              1975  9304                                                  ; send data packet
            54    FFFB6C20 8F   D0  1975  9305 90$:     MOVL    #DELAY_TIME1,R4           ; load send packet delay time
                       55   93  DE  197C  9306          MOVAL   a(R3)+,R5                 ; point to data packet
            57    00000084 8F   D0  197F  9307          MOVL    #132,R7                   ; load transfer byte count
                00000203D'EF   16  1986  9308          JSB     SEND_TU58                 ; send data packet
        24 00000000'EF    00  E1  198C  9309          BBC     #V_CLOCK_FLAG,B_FLAGS,110$ ; br = no timeout error
                              1994  9310          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=NO_READY
                00001BEB'EF   DF  1994                          PUSHAL  NO_READY
                0000190D'EF   DF  199A                          PUSHAL  T_WR_REC_ERR
                          00  DD  19A0                          PUSHL   #0
                          04  DD  19A2                          PUSHL   #$ER
                              19A4        ;;; TEST 12, SUBTEST 11, ERROR 4
            000100D0 9F   04  FB  19A4                          CALLS   #$$M, a#DS$ERRHARD
                              19AB  9311          $DS_BNCOMPLETE  100$
                       03 50  E9  19AB                          BLBC    R0, 100$
                              19AE  9312          $DS_ABORT       TEST
                          50  D4  19AE                          CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                          04  19B0                              RET                     ; TERMINATE TEST
                              19B1  9313 100$:    $DS_ABORT
            00010020 9F   6C  FA  19B1                          CALLG   (AP), a#DS$ABORT
```

```
                                  19B8  9314
          00000000'FF    94      19B8  9315 110$:   CLRB    @A_BUFFER_BEGIN          ; clear buffer used to store continue
   0A 00000001'EF    01    E1    19BE  9316         BBC     #V_REPEAT_SEND,B_FLAGS2,115$ ; br =  not repeating
      00000001'EF    02    8A    19C6  9317         BICB2   #M_REPEAT_SEND,B_FLAGS2 ; clear repeat flag to stop repeating
                  FF19    31    19CD  9318         BRW     30$                      ; finish sending data
                                  19D0  9319                                          ; read end packet
      54   FF7E4CE0 8F    D0    19D0  9320 115$:   MOVL    #DELAY_TIME7,R4          ; load receive packet delay time
      55   00000000'FF    9E    19D7  9321         MOVAB   @A_BUFFER_BEGIN,R5       ; load buffer address to store data
          57    55    0E    C1    19DE  9322         ADDL3   #14,R5,R7                ; load last expected address of data
          000020C8'EF    16    19E2  9323         JSB     MRECEIVE_TU58            ; go get data from TU58
               5A    93    DE    19E8  9324         MOVAL   @(R3)+,R10               ; load address of expected end packet
      5B   00000000'FF    9E    19EB  9325         MOVAB   @A_BUFFER_BEGIN,R11      ; load address of actual end packet
               57    55    D1    19F2  9326         CMPL    R5,R7                    ; check for correct number of bytes
                     31    13    19F5  9327         BEQL    150$                     ; br = correct number of bytes
      00000000'EF    08    88    19F7  9328         BISB2   #M_END_FLAG,B_FLAGS      ; set end error flag
                                  19FE  9329 117$:   $DS_ERRHARD_S    ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=REC_ERR,-
                                  19FE  9330                          P1=#T_REC_END
          00001D2E'8F    DD    19FE                         PUSHL   #T_REC_END
          00001EB4'EF    DF    1A04                         PUSHAL  REC_ERR
          0000190D'EF    DF    1A0A                         PUSHAL  T_WR_REC_ERR
                     00    DD    1A10                         PUSHL   #0
                     05    DD    1A12                         PUSHL   #$ER
                                  1A14          ;;; TEST 12, SUBTEST 11, ERROR 5
      000100D0 9F    05    FB    1A14                         CALLS   #$$M, @#DS$ERRHARD
                                  1A1B  9331         $DS_BNCOMPLETE  120$
                  03 50    E9    1A1B                         BLBC    R0, 120$
                                  1A1E  9332         $DS_ABORT       TEST
                     50    D4    1A1E                         CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                           04    1A20                         RET                      ; TERMINATE TEST
                                  1A21  9333
                                  1A21  9334 120$:   $DS_ABORT
      00010020 9F    6C    FA    1A21                         CALLG   (AP), @#DS$ABORT
                                  1A28  9335                                          ; check end packet
               5C    0E    D0    1A28  9336 150$:   MOVL    #14,R12                  ; load number of bytes to check
                                  1A2B  9337         $DS_BREAK
      00010058 9F    6E    FA    1A2B                         CALLG   (SP), @#DS$BREAK
          0000213B'EF    16    1A32  9338         JSB     CHECK_PACKET             ; go check end packet
                                  1A38  9339         $DS_BNCOMPLETE  160$             ; br = no error
                  21 50    E9    1A38                         BLBC    R0, 160$
                                  1A3B  9340         $DS_ERRHARD_S    ,UNIT=#0,MSGADR=T_WR_REC_ERR,PRLINK=DATA_ERR_END
          00001E9D'EF    DF    1A3B                         PUSHAL  DATA_ERR_END
          0000190D'EF    DF    1A41                         PUSHAL  T_WR_REC_ERR
                     00    DD    1A47                         PUSHL   #0
                     06    DD    1A49                         PUSHL   #$ER
                                  1A4B          ;;; TEST 12, SUBTEST 11, ERROR 6
      000100D0 9F    04    FB    1A4B                         CALLS   #$$M, @#DS$ERRHARD
                                  1A52  9341         $DS_BCOMPLETE   160$             ; br = error, but continue
                  07 50    E8    1A52                         BLBS    R0, 160$
                                  1A55  9342         $DS_ABORT
      00010020 9F    6C    FA    1A55                         CALLG   (AP), @#DS$ABORT
                                  1A5C  9343                                          ; clear buffers
          00000000'EF    94    1A5C  9344 160$:   CLRB    B_FLAGS                  ; initialize flags
      58   00000000'FF    9E    1A62  9345         MOVAB   @A_BUFFER_BEGIN,R8       ; load buffer starting address
      59   00000600 8F    D0    1A69  9346         MOVL    #BUFFER_SIZE,R9          ; do all pages
          00002134'EF    16    1A70  9347         JSB     CLEAR_BUFFER             ; go clear buffers
```

```
                                1A76  9348                                          ; send read command
      54   FFFB6C20 8F   D0    1A76  9349          MOVL    #DELAY_TIME1,R4          ; load send packet delay time
                55   93   DE    1A7D  9350          MOVAL   @(R3)+,R5                ; point to read command packet
                57   0E   D0    1A80  9351          MOVL    #14,R7                   ; load transfer byte count
           0000203D'EF   16    1A83  9352          JSB     SEND_TU58                ; send command packet
   24 00000000'EF   00   E1    1A89  9353          BBC     #V_CLOCK_FLAG,B_FLAGS,190$ ; br = no timeout error
                                1A91  9354          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=NO_READY
           00001BEB'EF   DF    1A91                        PUSHAL  NO_READY
           00001931'EF   DF    1A97                        PUSHAL  T_RD_REC_ERR
                    00   DD    1A9D                        PUSHL   #0
                    07   DD    1A9F                        PUSHL   #$ER
                                1AA1        ;;; TEST 12, SUBTEST 11, ERROR 7
      000100D0 9F   04   FB    1AA1                        CALLS   #$$M, @#DS$ERRHARD
                                1AA8  9355          $DS_BNCOMPLETE  180$
                 03 50   E9    1AA8                        BLBC    R0, 180$
                                1AAB  9356          $DS_ABORT       TEST
                    50   D4    1AAB                        CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                         04    1AAD                        RET                      ; TERMINATE TEST
                                1AAE  9357 180$:    $DS_ABORT
      00010020 9F   6C   FA    1AAE                        CALLG   (AP), @#DS$ABORT
                                1AB5  9358                                          ; read data and end packets
      54   FFF3CB00 8F   D0    1AB5  9359 190$:    MOVL    #DELAY_TIME3,R4          ; load receive packet delay time
      55   00000000'FF   9E    1ABC  9360          MOVAB   @A_BUFFER_BEGIN,R5       ; load buffer address to store data
   57 55   00000084 8F   C1    1AC3  9361          ADDL3   #132,R5,R7               ; load last expected address of data
   07 00000001'EF   02   E1    1ACB  9362          BBC     #V_REPEAT_CHECK,B_FLAGS2,195$ ; br = not repeating
      57   00000084 8F   C0    1AD3  9363          ADDL2   #132,R7                  ; must double buffer if repeating
                57   0E   C0    1ADA  9364 195$:    ADDL2   #14,R7                   ; add end packet to address
           000020C8'EF   16    1ADD  9365          JSB     MRECEIVE_TU58            ; go get data from TU58
      5B   00000000'FF   9E    1AE3  9366          MOVAB   @A_BUFFER_BEGIN,R11      ; load address of buffer
                5A   93   DE    1AEA  9367          MOVAL   @(R3)+,R10               ; load address of expected data
                57   55   D1    1AED  9368          CMPL    R5,R7                    ; check for correct number of bytes
                    31   13    1AF0  9369          BEQL    230$                     ; br = correct number of bytes
      00000000'EF   04   88    1AF2  9370          BISB2   #M_DATA_FLAG,B_FLAGS     ; set data error flag
                                1AF9  9371 197$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=REC_ERR,-
                                1AF9  9372                          P1=#T_REC_DATA
           00001D68'8F   DD    1AF9                        PUSHL   #T_REC_DATA
           00001EB4'EF   DF    1AFF                        PUSHAL  REC_ERR
           00001931'EF   DF    1B05                        PUSHAL  T_RD_REC_ERR
                    00   DD    1B0B                        PUSHL   #0
                    08   DD    1B0D                        PUSHL   #$ER
                                1B0F        ;;; TEST 12, SUBTEST 11, ERROR 8
      000100D0 9F   05   FB    1B0F                        CALLS   #$$M, @#DS$ERRHARD
                                1B16  9373          $DS_BNCOMPLETE  200$
                 03 50   E9    1B16                        BLBC    R0, 200$
                                1B19  9374          $DS_ABORT       TEST
                    50   D4    1B19                        CLRL    R0               ; SEND A WARNING TO THE SUPERVISOR
                         04    1B1B                        RET                      ; TERMINATE TEST
                                1B1C  9375
                                1B1C  9376 200$:    $DS_ABORT
      00010020 9F   6C   FA    1B1C                        CALLG   (AP), @#DS$ABORT
                                1B23  9377                                          ; check data packets
      5C   00000084 8F   D0    1B23  9378 230$:    MOVL    #132,R12                 ; load number of bytes to check
                                1B2A  9379 240$:    $DS_BREAK
      00010058 9F   6E   FA    1B2A                        CALLG   (SP), @#DS$BREAK
           0000213B'EF   16    1B31  9380          JSB     CHECK_PACKET             ; go check data packet
```

```
                                1B37  9381          $DS_BNCOMPLETE  260$                    ; br = no error
                  24 50   E9    1B37                BLBC    R0, 260$
                                1B3A  9382          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=DATA_ERR_DATA
          00001E75'EF   DF      1B3A                PUSHAL  DATA_ERR_DATA
          00001931'EF   DF      1B40                PUSHAL  T_RD_REC_ERR
                  00    DD      1B46                PUSHL   #0
                  09    DD      1B48                PUSHL   #$ER
                                1B4A        ;;; TEST 12, SUBTEST 11, ERROR 9
      000100D0 9F   04    FB    1B4A                CALLS   #$$M, a#DS$ERRHARD
                                1B51  9383          $DS_BNCOMPLETE  250$
                  03 50   E9    1B51                BLBC    R0, 250$
                                1B54  9384          $DS_ABORT       TEST
                     50   D4    1B54                CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                          04    1B56                RET                             ; TERMINATE TEST
                                1B57  9385 250$:    $DS_ABORT
      00010020 9F   6C    FA    1B57                CALLG   (AP), a#DS$ABORT
   5B   00000084 8F   C0    1B5E  9386 260$:    ADDL2   #132,R11                    ; adjust pointer to next packet
0C 00000001'EF   02    E1    1B65  9387          BBC     #V_REPEAT_CHECK,B_FLAGS2,265$ ; br = not repeating
          00000001'EF   94    1B6D  9388          CLRB    B_FLAGS2                    ; clear repeat flag to stop repeating
             5A   93    DE    1B73  9389          MOVAL   a(R3)+,R10                  ; load address of expected data
                FFB1    31    1B76  9390          BRW     240$                        ; check rest of data packets
                              1B79  9391                                              ; check end packet
             5A   93    DE    1B79  9392 265$:    MOVAL   a(R3)+,R10                  ; load address of expected end packet
             5C   0E    D0    1B7C  9393          MOVL    #14,R12                     ; load number of bytes to check
                              1B7F  9394          $DS_BREAK
      00010058 9F   6E    FA    1B7F                CALLG   (SP), a#DS$BREAK
          0000213B'EF   16    1B86  9395          JSB     CHECK_PACKET                ; go check end packet
                              1B8C  9396          $DS_BNCOMPLETE  275$                ; br = no error
                  24 50   E9    1B8C                BLBC    R0, 275$
                              1B8F  9397          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_REC_ERR,PRLINK=DATA_ERR_END
          00001E9D'EF   DF      1B8F                PUSHAL  DATA_ERR_END
          00001931'EF   DF      1B95                PUSHAL  T_RD_REC_ERR
                  00    DD      1B9B                PUSHL   #0
                  0A    DD      1B9D                PUSHL   #$ER
                                1B9F        ;;; TEST 12, SUBTEST 11, ERROR 10
      000100D0 9F   04    FB    1B9F                CALLS   #$$M, a#DS$ERRHARD
                                1BA6  9398          $DS_BNCOMPLETE  270$
                  03 50   E9    1BA6                BLBC    R0, 270$
                                1BA9  9399          $DS_ABORT       TEST
                     50   D4    1BA9                CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                          04    1BAB                RET                             ; TERMINATE TEST
                                1BAC  9400 270$:    $DS_ABORT
      00010020 9F   6C    FA    1BAC                CALLG   (AP), a#DS$ABORT
FCD3 00000004'EF   01    04    9D    1BB3  9401 275$:    ACBB    #4,#1,B_COUNT1,10$      ; br = not finished executing test
                              1BBD  9402
                              1BBD  9403
                              1BBD  9404          $DS_ENDSUB
                              1BBD        T12_S11_X:
 00010038 9F   00000168'EF    FA    1BBD                CALLG   $S$, a#DS$ENDSUB
                              1BC8  9405          $DS_PAGE
```

```
1BC8                    .SBTTL  SUBTEST 12.12:  WRITE RECORD INTERRUPT
1BC8  9408 ;+
1BC8  9409 ; SUBTEST DESCRIPTION:
1BC8  9410 ;
1BC8  9411 ;       This subtest sends the TU58 a command packet to write one record
1BC8  9412 ;       of 128 bytes in interrupt mode. When an interrupt occurs the write service-
1BC8  9413 ;       ice routine sends the next byte. A timeout occurs after sufficient time
1BC8  9414 ;       has passed to send a full packet, at which time an end packet is
1BC8  9415 ;       read and checked. An error is reported if an interrupt fails to occur
1BC8  9416 ;       before the timer expires and the full packet has not been sent. The data
1BC8  9417 ;       packet sent contains alternating bytes of all one's and all zero's.
1BC8  9418 ;       The data will be read and checked for errors in the next subtest.
1BC8  9419 ;
1BC8  9420 ;
1BC8  9421 ; SUBTEST STEPS:
1BC8  9422 ;
1BC8  9423 ;       SUBTEST WRITE RECORD INTERRUPT
1BC8  9424 ;       :  Clear buffer
1BC8  9425 ;       :  Point to write command packet
1BC8  9426 ;       :  REPEAT
1BC8  9427 ;       :  :  Send command packet byte at a time
1BC8  9428 ;       :  :  Set timer
1BC8  9429 ;       :  :  IF timer expired AND no response
1BC8  9430 ;       :  :  :  THEN
1BC8  9431 ;       :  :  :  Report no response error
1BC8  9432 ;       :  :  :  Exit test
1BC8  9433 ;       :  :  ENDIF
1BC8  9434 ;       :  : UNTIL all bytes sent
1BC8  9435 ;       :  ENDREPEAT
1BC8  9436 ;       :  Wait for continue
1BC8  9437 ;       :  Set timer
1BC8  9438 ;       :  IF timer expired AND no continue
1BC8  9439 ;       :  :  THEN
1BC8  9440 ;       :  :  Report no continue error
1BC8  9441 ;       :  :  Exit test
1BC8  9442 ;       :  ENDIF
1BC8  9443 ;       :  Point to data packet
1BC8  9444 ;       :  Enable send interrupt
1BC8  9445 ;       :  REPEAT
1BC8  9446 ;       :  :  Send data packet byte at a time
1BC8  9447 ;       :  :  Set timer
1BC8  9448 ;       :  :  IF timer expired AND no response
1BC8  9449 ;       :  :  :  THEN
1BC8  9450 ;       :  :  :  :  DISABLE send interrupt
1BC8  9451 ;       :  :  :  :  Report no response error
1BC8  9452 ;       :  :  :  :  Exit test
1BC8  9453 ;       :  :  ENDIF
1BC8  9454 ;       :  : UNTIL all bytes sent
1BC8  9455 ;       :  ENDREPEAT
1BC8  9456 ;       :  DISABLE send interrupt
1BC8  9457 ;       :  REPEAT
1BC8  9458 ;       :  :  Set timer
1BC8  9459 ;       :  :  IF timer expired AND done set
1BC8  9460 ;       :  :  :  THEN
1BC8  9461 ;       :  :  :  :  Read byte
```

```
                                1BC8  9462 ;       :  : ENDIF
                                1BC8  9463 ;       :  : UNTIL timer expired AND done clear
                                1BC8  9464 ;       :  ENDREPEAT
                                1BC8  9465 ;       :  IF expected byte count NEQ actual byte count
                                1BC8  9466 ;       :  : THEN
                                1BC8  9467 ;       :  : : Report error
                                1BC8  9468 ;       :  : : Exit test
                                1BC8  9469 ;       :  ENDIF
                                1BC8  9470 ;       :  REPEAT
                                1BC8  9471 ;       :  : Point to expected end packet
                                1BC8  9472 ;       :  : IF expected end packet data NEQ received end packet data
                                1BC8  9473 ;       :  : : THEN
                                1BC8  9474 ;       :  : : Report end packet data error
                                1BC8  9475 ;       :  : ENDIF
                                1BC8  9476 ;       :  : UNTIL all data checked
                                1BC8  9477 ;       :  ENDREPEAT
                                1BC8  9478 ;       ENDSUBTEST WRITE RECORD INTERRUPT
                                1BC8  9479 ;
                                1BC8  9480 ;
                                1BC8  9481 ;
                                1BC8  9482 ;.page
                                1BC8  9483 ;-
                                1BC8  9484
                                1BC8  9485         $DS_BGNSUB
                                1BC8       T12_S12::
    00010030 9F   00000174'EF   FA  1BC8                  CALLG   $S$, a#DS$BGNSUB
                                1BD3  9486         $DS_SETVEC_S    VECTOR=#SCB$L_CSTD,SRVADR=WRITE_SERVICE
                          00    DD  1BD3                  PUSHL   #0
                000021D4'EF     DF  1BD5                  PUSHAL  WRITE_SERVICE
                000000F4 8F     DD  1BDB                  PUSHL   #SCB$L_CSTD
            00010160 9F   03    FB  1BE1                  CALLS   #3, a#DS$SETVEC
                00000000'EF     94  1BE8  9487         CLRB    B_FLAGS                 ; initialize flags
                00000002'EF     94  1BEE  9488         CLRB    B_FLAGS3
                                1BF4  9489                                         ; clear buffers
            58  00000000'FF     9E  1BF4  9490         MOVAB   aA_BUFFER_BEGIN,R8      ; load buffer starting address
            59  00000400 8F     D0  1BFB  9491         MOVL    #1024,R9                ; do two pages
                00002134'EF     16  1C02  9492         JSB     CLEAR_BUFFER            ; go clear buffers
                                1C08  9493                                         ; send write command
            54  FFE17B80 8F     D0  1C08  9494         MOVL    #DELAY_TIME5,R4         ; load send packet delay time
            55  0000035E'EF     9E  1C0F  9495         MOVAB   MB_WRITE_3_CMD,R5       ; point to write command packet
                      57    0E  D0  1C16  9496         MOVL    #14,R7                  ; load transfer byte count
                0000203D'EF     16  1C19  9497         JSB     SEND_TU58               ; send command packet
        24 00000000'EF    00    E1  1C1F  9498         BBC     #V_CLOCK_FLAG,B_FLAGS,20$ ; br = no timeout error
                                1C27  9499         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_INT_ERR,PRLINK=NO_READY
                00001BEB'EF     DF  1C27                  PUSHAL  NO_READY
                000019D1'EF     DF  1C2D                  PUSHAL  T_WR_INT_ERR
                          00    DD  1C33                  PUSHL   #0
                          01    DD  1C35                  PUSHL   #$ER
                                1C37       ;;; TEST 12, SUBTEST 12, ERROR 1
            000100D0 9F   04    FB  1C37                  CALLS   #$$M, a#DS$ERRHARD
                                1C3E  9500         $DS_BNCOMPLETE  10$
                       03 50    E9  1C3E                  BLBC    R0, 10$
                                1C41  9501         $DS_ABORT       TEST
                          50    D4  1C41                  CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                                04  1C43                  RET                         ; TERMINATE TEST
```

```
                        1C44  9502 10$:    $DS_ABORT
00010020 9F   6C   FA   1C44                    CALLG   (AP), a#DS$ABORT
                        1C4B  9503                                      ; read continue
54   FFF3CB00 8F   D0   1C4B  9504 20$:    MOVL    #DELAY_TIME3,R4      ; load receive packet delay time
55    00000000'FF  9E   1C52  9505          MOVAB   aA_BUFFER_BEGIN,R5   ; load buffer address to store data
    57   55   01   C1   1C59  9506          ADDL3   #1,R5,R7             ; load last expected address of data
     000020C8'EF   16   1C5D  9507          JSB     MRECEIVE_TU58        ; go get data from TU58
5A    00000023'EF  9E   1C63  9508          MOVAB   B_CONTINUE,R10       ; load address of expected data
5B    00000000'FF  9E   1C6A  9509          MOVAB   aA_BUFFER_BEGIN,R11  ; load address of actual data
        57   55   D1   1C71  9510          CMPL    R5,R7                ; check for correct number of bytes
             2A   13   1C74  9511          BEQL    60$                  ; br = correct number of bytes
                        1C76  9512 25$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_INT_ERR,PRLINK=REC_ERR,-
                        1C76  9513                      P1=#T_REC_CONT
     00001D47'8F   DD   1C76                    PUSHL   #T_REC_CONT
     00001EB4'EF   DF   1C7C                    PUSHAL  REC_ERR
     000019D1'EF   DF   1C82                    PUSHAL  T_WR_INT_ERR
             00    DD   1C88                    PUSHL   #0
             02    DD   1C8A                    PUSHL   #$ER
                        1C8C          ;;; TEST 12, SUBTEST 12, ERROR 2
000100D0 9F   05   FB   1C8C                    CALLS   #$$M, a#DS$ERRHARD
                        1C93  9514          $DS_BNCOMPLETE  30$
          03 50   E9   1C93                    BLBC    R0, 30$
                        1C96  9515          $DS_ABORT       TEST
             50   D4   1C96                    CLRL    R0                   ; SEND A WARNING TO THE SUPERVISOR
                  04   1C98                    RET                          ; TERMINATE TEST
                        1C99  9516
                        1C99  9517 30$:    $DS_ABORT
00010020 9F   6C   FA   1C99                    CALLG   (AP), a#DS$ABORT
                        1CA0  9518                                      ; check continue
          5C   01   D0   1CA0  9519 60$:    MOVL    #1,R12               ; load number of bytes to check
                        1CA3  9520          $DS_BREAK
00010058 9F   6E   FA   1CA3                    CALLG   (SP), a#DS$BREAK
     0000213B'EF   16   1CAA  9521          JSB     CHECK_PACKET         ; go check continue
                        1CB0  9522          $DS_BNCOMPLETE  80$           ; br = no error
           24 50   E9   1CB0                    BLBC    R0, 80$
                        1CB3  9523          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_INT_ERR,PRLINK=DATA_ERR_CONT
     00001E4D'EF   DF   1CB3                    PUSHAL  DATA_ERR_CONT
     000019D1'EF   DF   1CB9                    PUSHAL  T_WR_INT_ERR
             00    DD   1CBF                    PUSHL   #0
             03    DD   1CC1                    PUSHL   #$ER
                        1CC3          ;;; TEST 12, SUBTEST 12, ERROR 3
000100D0 9F   04   FB   1CC3                    CALLS   #$$M, a#DS$ERRHARD
                        1CCA  9524          $DS_BNCOMPLETE  70$
          03 50   E9   1CCA                    BLBC    R0, 70$
                        1CCD  9525          $DS_ABORT       TEST
             50   D4   1CCD                    CLRL    R0                   ; SEND A WARNING TO THE SUPERVISOR
                  04   1CCF                    RET                          ; TERMINATE TEST
                        1CD0  9526 70$:    $DS_ABORT
00010020 9F   6C   FA   1CD0                    CALLG   (AP), a#DS$ABORT
                        1CD7  9527                                      ; send data packet
     00000000'EF   94   1CD7  9528 80$:    CLRB    B_FLAGS              ; clear byte flags
     00000001'EF   94   1CDD  9529          CLRB    B_FLAGS2             ; clear byte flags
     00000002'EF   94   1CE3  9530          CLRB    B_FLAGS3             ; clear byte flags
55   0000070A'EF   9E   1CE9  9531          MOVAB   B_DATA_PKT_2,R5      ; point to data packet
57 55 00000084 8F   C1   1CF0  9532          ADDL3   #132,R5,R7           ; load pointer to end of data
```

```
                19   FF7E4CE0 8F    DA  1CF8  9533          MTPR    #DELAY_TIME7,#PR750$_NICR       ; load interval register    5.2
                00000000'8F   10    DA  1CFF  9534          MTPR    #M_TRANSFER,#PR$_ICCS   ; transfer time to ICS
                        19    01    DA  1D06  9535          MTPR    #1,#PR750$_NICR         ; load very long next interval      5.2
    00000000'8F    80000041 8F    DA  1D09  9536          MTPR    #<M_ERROR+M_ENABLE+M_RUN>,#PR$_ICCS ; start timer
                1E   00000040 8F    DA  1D14  9537          MTPR    #M_ENABLE,#PR750$_CSTS  ; enable send interrupt             5.2
                                    1D1B  9538
                                    1D1B  9539 85$:     $DS_BREAK
                00010058 9F    6E   FA  1D1B                      CALLG   (SP), a#DS$BREAK
          08 00000002'EF    01    E0  1D22  9540          BBS     #V_SDONE_FLAG,B_FLAGS3,87$ ; br = finished sending
          E9 00000000'EF    00    E1  1D2A  9541          BBC     #V_CLOCK_FLAG,B_FLAGS,85$ ; br = no timeout
                        1E    00    DA  1D32  9542 87$:     MTPR    #0,#PR750$_CSTS         ; disable send interrupt            5.2
                        57    55    D1  1D35  9543          CMPL    R5,R7                   ; check number of bytes sent
                              24    13  1D38  9544 -        BEQL    100$                    ; br = correct number of bytes sent
                                    1D3A  9545          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_INT_ERR,PRLINK=SEND_INT_ERR
                        00001AC9'EF   DF  1D3A                      PUSHAL  SEND_INT_ERR
                        000019D1'EF   DF  1D40                      PUSHAL  T_WR_INT_ERR
                                00    DD  1D46                      PUSHL   #0
                                04    DD  1D48                      PUSHL   #$ER
                                    1D4A        ;;; TEST 12, SUBTEST 12, ERROR 4
                000100D0 9F    04   FB  1D4A                      CALLS   #$$M, a#DS$ERRHARD
                                    1D51  9546          $DS_BNCOMPLETE  90$
                           03 50    E9  1D51                      BLBC    R0, 90$
                                    1D54  9547          $DS_ABORT       TEST
                                50    D4  1D54                      CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                                04    D4  1D56                      RET                     ; TERMINATE TEST
                                    1D57  9548 90$:     $DS_ABORT
                00010020 9F    6C   FA  1D57                      CALLG   (AP), a#DS$ABORT
                                    1D5E  9549                                          ; read end packet
                     00000002'EF    96  1D5E  9550 100$:   INCB    B_FLAGS3                ; set data done flag
    54    FF7E4CE0 8F    D0    1D64  9551          MOVL    #DELAY_TIME7,R4             ; load receive packet delay time
    55    00000000'FF    9E    1D6B  9552          MOVAB   @A_BUFFER_BEGIN,R5          ; load address to store actual data
        57    55    0E    C1  1D72  9553          ADDL3   #14,R5,R7                   ; load last expected address of data
                000020C8'EF   16    1D76  9554          JSB     MRECEIVE_TU58           ; go get data from TU58
    5A    00000698'EF    9E    1D7C  9555          MOVAB   MB_END_PACKET_5,R10         ; load address of expected end packet
    5B    00000000'FF    9E    1D83  9556          MOVAB   @A_BUFFER_BEGIN,R11         ; load address of actual end packet
                57    55    D1  1D8A  9557          CMPL    R5,R7                       ; check for correct number of bytes
                        31    13  1D8D  9558          BEQL    140$                        ; br = correct number of bytes
    00000000'EF    08    88   1D8F  9559          BISB2   #M_END_FLAG,B_FLAGS         ; set end error flag
                                    1D96  9560 105$:    $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_INT_ERR,PRLINK=REC_ERR,-
                                    1D96  9561                      P1=#T_REC_END
                00001D2E'8F    DD   1D96                      PUSHL   #T_REC_END
                00001EB4'EF    DF   1D9C                      PUSHAL  REC_ERR
                000019D1'EF    DF   1DA2                      PUSHAL  T_WR_INT_ERR
                        00     DD   1DA8                      PUSHL   #0
                        05     DD   1DAA                      PUSHL   #$ER
                                    1DAC        ;;; TEST 12, SUBTEST 12, ERROR 5
    000100D0 9F    05   FB  1DAC                      CALLS   #$$M, a#DS$ERRHARD
                                    1DB3  9562          $DS_BNCOMPLETE  110$
                    03 50    E9  1DB3                      BLBC    R0, 110$
                                    1DB6  9563          $DS_ABORT       TEST
                        50    D4  1DB6                      CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                        04    D4  1DB8                      RET                     ; TERMINATE TEST
                                    1DB9  9564
                                    1DB9  9565 110$:    $DS_ABORT
    00010020 9F    6C   FA  1DB9                      CALLG   (AP), a#DS$ABORT
```

```
                                  1DC0  9566                                          ; check end packet
                  5C    0E    D0  1DC0  9567 140$:   MOVL    #14,R12                 ; load number of bytes to check
                                  1DC3  9568         $DS_BREAK
         00010058 9F    6E    FA  1DC3                       CALLG   (SP), a#DS$BREAK
              0000213B'EF    16  1DCA  9569         JSB     CHECK_PACKET            ; go check end packet
                                  1DD0  9570         $DS_BNCOMPLETE  160$            ; br = no error
                     24 50    E9  1DD0                       BLBC    R0, 160$
                                  1DD3  9571         $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_WR_INT_ERR,PRLINK=DATA_ERR_END
              00001E9D'EF    DF  1DD3                       PUSHAL  DATA_ERR_END
              000019D1'EF    DF  1DD9                       PUSHAL  T_WR_INT_ERR
                        00   DD  1DDF                       PUSHL   #0
                        06   DD  1DE1                       PUSHL   #$ER
                                  1DE3       ;;; TEST 12, SUBTEST 12, ERROR 6
         000100D0 9F    04    FB  1DE3                       CALLS   #$$M, a#DS$ERRHARD
                                  1DEA  9572         $DS_BNCOMPLETE  150$
                     03 50    E9  1DEA                       BLBC    R0, 150$
                                  1DED  9573         $DS_ABORT       TEST
                        50   D4  1DED                       CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                             04  1DEF                       RET                     ; TERMINATE TEST
                                  1DF0  9574 150$:   $DS_ABORT
         00010020 9F    6C    FA  1DF0                       CALLG   (AP), a#DS$ABORT
                                  1DF7  9575 160$:
                                  1DF7  9576         $DS_ENDSUB
                                  1DF7       T12_S12_X:
   00010038 9F   00000174'EF   FA  1DF7                       CALLG   $S$, a#DS$ENDSUB
                                  1E02  9577         $DS_PAGE
```

```
1E02                    .SBTTL  SUBTEST 12.13:  READ RECORD INTERRUPT
1E02  9580 ;+
1E02  9581 ; SUBTEST DESCRIPTION:
1E02  9582 ;
1E02  9583 ;       This subtest sends the TU58 a command packet to read the last 128
1E02  9584 ;       bytes of data that were written in the previous subtest in the inter-
1E02  9585 ;       rupt-driven mode. A timer is set which should allow sufficient time
1E02  9586 ;       to read a complete record and end packet. An error is reported if
1E02  9587 ;       this does not occur within the allotted time. The end packet and data
1E02  9588 ;       packet are checked for errors. If any errors are encountered they are
1E02  9589 ;       reported.
1E02  9590 ;
1E02  9591 ;
1E02  9592 ; SUBTEST STEPS:
1E02  9593 ;
1E02  9594 ;       SUBTEST READ RECORD INTERRUPT
1E02  9595 ;       :  Clear buffer
1E02  9596 ;       :  Point to read command packet
1E02  9597 ;       :  REPEAT
1E02  9598 ;       :  :  Send command packet byte at a time
1E02  9599 ;       :  :  Set timer
1E02  9600 ;       :  :  IF timer expired and no response
1E02  9601 ;       :  :  :  THEN
1E02  9602 ;       :  :  :  Report no response error
1E02  9603 ;       :  :  :  Exit test
1E02  9604 ;       :  :  ENDIF
1E02  9605 ;       :  : UNTIL all bytes sent
1E02  9606 ;       :  ENDREPEAT
1E02  9607 ;       :  ENABLE read interrupt
1E02  9608 ;       :  SET timer
1E02  9609 ;       :  REPEAT
1E02  9610 ;       :  :  IF interrupt occurs
1E02  9611 ;       :  :  :  THEN
1E02  9612 ;       :  :  :  :  Read byte
1E02  9613 ;       :  :  ENDIF
1E02  9614 ;       :  : UNTIL timer expired
1E02  9615 ;       :  ENDREPEAT
1E02  9616 ;       :  IF expected byte count NEQ actual byte count
1E02  9617 ;       :  :  THEN
1E02  9618 ;       :  :  :  DISABLE read interrupt
1E02  9619 ;       :  :  :  Report error
1E02  9620 ;       :  :  :  Exit test
1E02  9621 ;       :  ENDIF
1E02  9622 ;       :  DISABLE read interrupt
1E02  9623 ;       :  Point to expected data packet
1E02  9624 ;       :  REPEAT
1E02  9625 ;       :  :  IF data expected NEQ data received
1E02  9626 ;       :  :  :  THEN
1E02  9627 ;       :  :  :  Report data error
1E02  9628 ;       :  :  :  Exit subtest
1E02  9629 ;       :  :  ENDIF
1E02  9630 ;       :  :  Point to next byte of data
1E02  9631 ;       :  : UNTIL all data in packet checked
1E02  9632 ;       :  ENDREPEAT
1E02  9633 ;       :  Point to expected end packet
```

```
                                1E02  9634 ;       :  REPEAT
                                1E02  9635 ;       :  :  IF expected end packet data NEQ received end packet data
                                1E02  9636 ;       :  :  :  THEN
                                1E02  9637 ;       :  :  :  Report end packet data error
                                1E02  9638 ;       :  :  :  Exit subtest
                                1E02  9639 ;       :  :  ENDIF
                                1E02  9640 ;       :  : UNTIL all end packet bytes checked
                                1E02  9641 ;       :  ENDREPEAT
                                1E02  9642 ;       ENDSUBTEST READ RECORD INTERRUPT
                                1E02  9643 ;
                                1E02  9644 ;
                                1E02  9645 ;
                                1E02  9646 ;.page
                                1E02  9647 ;-
                                1E02  9648          $DS_BGNSUB
                                1E02        T12_S13::
 00010030 9F   00000180'EF   FA 1E02                CALLG   $S$, a#DS$BGNSUB
                                1E0D  9649          $DS_SETVEC_S    VECTOR=#SCB$L_CSRD,SRVADR=MREAD_SERVICE
                          00    DD 1E0D                PUSHL   #0
                0000216C'EF     DF 1E0F                PUSHAL  MREAD_SERVICE
                000000F0 8F     DD 1E15                PUSHL   #SCB$L_CSRD
             00010160 9F    03  FB 1E1B                CALLS   #3, a#DS$SETVEC
                00000000'EF     94 1E22  9650          CLRB    B_FLAGS                 ; clear byte flags
                00000001'EF     94 1E28  9651          CLRB    B_FLAGS2                ; clear byte flags
             58 00000000'FF     9E 1E2E  9652          MOVAB   aA_BUFFER_BEGIN,R8      ; load buffer start address
             59 00000400 8F     D0 1E35  9653          MOVL    #1024,R9                ; load number of bytes to clear
                00002134'EF     16 1E3C  9654          JSB     CLEAR_BUFFER            ; go clear buffer
             1C 00000040 8F     DA 1E42  9655          MTPR    #M_ENABLE,#PR750$_CSRS  ; enable read interrupt         5.2
             53 00000000'FF     9E 1E49  9656          MOVAB   aA_BUFFER_BEGIN,R3      ; load buffer address
          59 00000092 8F    53  C1 1E50  9657          ADDL3   R3,#146,R9              ; load expected end of buffer
             55 0000036C'EF     9E 1E58  9658          MOVAB   MB_READ_3_CMD,R5                ; point to read record command pac -
cont> ket
                   57    0E    D0 1E5F  9659          MOVL    #14,R7                  ; load byte count
                0000203D'EF     16 1E62  9660          JSB     SEND_TU58               ; send command packet
          24 00000000'EF    00  E1 1E68  9661          BBC     #V_CLOCK_FLAG,B_FLAGS,20$ ; br = no timeout error
                                1E70  9662          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_INT_ERR,PRLINK=NO_READY
                00001BEB'EF     DF 1E70                PUSHAL  NO_READY
                0000199F'EF     DF 1E76                PUSHAL  T_RD_INT_ERR
                          00    DD 1E7C                PUSHL   #0
                          01    DD 1E7E                PUSHL   #$ER
                                1E80        ;;; TEST 12, SUBTEST 13, ERROR 1
             000100D0 9F    04  FB 1E80                CALLS   #$$M, a#DS$ERRHARD
                                1E87  9663          $DS_BNCOMPLETE  10$
                       03 50    E9 1E87                BLBC    R0, 10$
                                1E8A  9664          $DS_ABORT       TEST
                          50    D4 1E8A                CLRL    R0                      ; SEND A WARNING TO THE SUPERVISOR
                          04    1E8C                   RET                             ; TERMINATE TEST
                                1E8D  9665 10$:     $DS_ABORT
             00010020 9F    6C  FA 1E8D                CALLG   (AP), a#DS$ABORT
                00000000'EF     94 1E94  9666 20$:     CLRB    B_FLAGS                 ; clear byte flags
             19 FF7E4CE0 8F     DA 1E9A  9667          MTPR    #DELAY_TIME7,#PR750$_NICR       ; load timer interval   5.2
             00000000'8F    10  DA 1EA1  9668          MTPR    #M_TRANSFER,#PR$_ICCS   ; transfer time to ICS
                       19    01  DA 1EA8  9669          MTPR    #1,#PR750$_NICR         ; load very long next interval  5.2
    00000000'8F   80000041 8F     DA 1EAB  9670          MTPR    #<M_ERROR+M_ENABLE+M_RUN>,#PR$_ICCS ; start timer
                                1EB6  9671 30$:     $DS_BREAK
             00010058 9F    6E  FA 1EB6                CALLG   (SP), a#DS$BREAK
```

```
                F1 00000000'EF    00    E1  1EBD  9672          BBC     #V_CLOCK_FLAG,B_FLAGS,30$ ; br = no timeout
                           1C     00    DA  1EC5  9673          MTPR    #0,#PR750$_CSRS           ; disable read interrupt        5.2
                   5B   00000000'FF    9E  1EC8  9674          MOVAB   @A_BUFFER_BEGIN,R11       ; load address of actual data
                   5A   0000070A'EF    9E  1ECF  9675          MOVAB   B_DATA_PKT_2,R10          ; load address of expected data
                              59   53   D1  1ED6  9676          CMPL    R3,R9                     ; correct number of bytes received ?
                                   34   13  1ED9  9677          BEQL    50$                       ; br = correct number of bytes received
                        00000000'EF    04   88  1EDB  9678          BISB2   #M_DATA_FLAG,B_FLAGS      ; set data error flag
                              55   53   D0  1EE2  9679          MOVL    R3,R5                     ; point to last address loaded
                                        1EE5  9680          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_INT_ERR,PRLINK=REC_ERR,-
                                        1EE5  9681                          P1=#T_REC_DATA
                             00001D68'8F    DD  1EE5                      PUSHL   #T_REC_DATA
                             00001EB4'EF    DF  1EEB                      PUSHAL  REC_ERR
                             0000199F'EF    DF  1EF1                      PUSHAL  T_RD_INT_ERR
                                        00  DD  1EF7                      PUSHL   #0
                                        02  DD  1EF9                      PUSHL   #$ER
                                        1EFB        ;;; TEST 12, SUBTEST 13, ERROR 2
                   000100D0 9F    05    FB  1EFB                      CALLS   #$$M, @#DS$ERRHARD
                                        1F02  9682          $DS_BNCOMPLETE  40$
                                     03 50   E9  1F02                      BLBC    R0, 40$
                                        1F05  9683          $DS_ABORT       TEST
                                        50  D4  1F05                      CLRL    R0                ; SEND A WARNING TO THE SUPERVISOR
                                        04  1F07                      RET                       ; TERMINATE TEST
                                        1F08  9684 40$:     $DS_ABORT
                   00010020 9F    6C    FA  1F08                      CALLG   (AP), @#DS$ABORT
                   5C   00000084 8F    D0  1F0F  9685 50$:     MOVL    #132,R12                  ; load number of bytes to check
                                        1F16  9686          $DS_BREAK
                   00010058 9F    6E    FA  1F16                      CALLG   (SP), @#DS$BREAK
                        0000213B'EF    16  1F1D  9687          JSB     CHECK_PACKET              ; go check data packet
                                        1F23  9688          $DS_BNCOMPLETE  70$               ; br = no data error
                                     24 50   E9  1F23                      BLBC    R0, 70$
                                        1F26  9689          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_INT_ERR,PRLINK=DATA_ERR_DATA
                             00001E75'EF    DF  1F26                      PUSHAL  DATA_ERR_DATA
                             0000199F'EF    DF  1F2C                      PUSHAL  T_RD_INT_ERR
                                        00  DD  1F32                      PUSHL   #0
                                        03  DD  1F34                      PUSHL   #$ER
                                        1F36        ;;; TEST 12, SUBTEST 13, ERROR 3
                   000100D0 9F    04    FB  1F36                      CALLS   #$$M, @#DS$ERRHARD
                                        1F3D  9690          $DS_BNCOMPLETE  60$
                                     03 50   E9  1F3D                      BLBC    R0, 60$
                                        1F40  9691          $DS_ABORT       TEST
                                        50  D4  1F40                      CLRL    R0                ; SEND A WARNING TO THE SUPERVISOR
                                        04  1F42                      RET                       ; TERMINATE TEST
                                        1F43  9692 60$:     $DS_ABORT
                   00010020 9F    6C    FA  1F43                      CALLG   (AP), @#DS$ABORT
                   5A   00000698'EF    9E  1F4A  9693 70$:     MOVAB   MB_END_PACKET_5,R10       ; load address of expected end packet
                   5B   00000084 8F    C0  1F51  9694          ADDL2   #132,R11                  ; adjust pointer to actual end packet
                              5C   0E   D0  1F58  9695          MOVL    #14,R12                   ; load number of bytes to check
                                        1F5B  9696          $DS_BREAK
                   00010058 9F    6E    FA  1F5B                      CALLG   (SP), @#DS$BREAK
                        0000213B'EF    16  1F62  9697          JSB     CHECK_PACKET              ; go check end packet
                                        1F68  9698          $DS_BNCOMPLETE  90$               ; br = no data error
                                     24 50   E9  1F68                      BLBC    R0, 90$
                                        1F6B  9699          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_RD_INT_ERR,PRLINK=DATA_ERR_END
                             00001E9D'EF    DF  1F6B                      PUSHAL  DATA_ERR_END
                             0000199F'EF    DF  1F71                      PUSHAL  T_RD_INT_ERR
```

```
                        00   DD  1F77                        PUSHL   #0
                        04   DD  1F79                        PUSHL   #$ER
                             1F7B       ;;; TEST 12, SUBTEST 13, ERROR 4
            000100D0 9F 04   FB  1F7B                        CALLS   #$$M, a#DS$ERRHARD
                             1F82  9700         $DS_BNCOMPLETE  80$
                     03 50   E9  1F82                        BLBC    R0, 80$
                             1F85  9701         $DS_ABORT       TEST
                        50   D4  1F85                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                             04  1F87                        RET                     ; TERMINATE TEST
                             1F88  9702 80$:    $DS_ABORT
            00010020 9F 6C   FA  1F88                        CALLG   (AP), a#DS$ABORT
                             1F8F  9703 90$:
                             1F8F  9704         $DS_ENDSUB
                             1F8F       T12_S13_X:
    00010038 9F 00000180'EF  FA  1F8F                        CALLG   $S$, a#DS$ENDSUB
                             1F9A  9705         $DS_PAGE
```

```
1F9A                    .SBTTL  SUBTEST 12.14:  IPL CHECK
1F9A  9708 ;+
1F9A  9709 ; SUBTEST DESCRIPTION:
1F9A  9710 ;
1F9A  9711 ;       This subtest checks that the TU58 interrupt occurs at the cor-
1F9A  9712 ;       rect interrupt priority level.  The IPL is set one level above
1F9A  9713 ;       that at which a TU58 interrupt should occur.  A NOP command is
1F9A  9714 ;       issued to cause the return  of an end packet in interrupt mode.
1F9A  9715 ;       If an interrupt occurs an error is reported.  The IPL is then
1F9A  9716 ;       decremented and if an interrupt does not occur within a reason-
1F9A  9717 ;       interval an error is reported.  There are no data checks made.
1F9A  9718 ;
1F9A  9719 ;
1F9A  9720 ; SUBTEST STEPS:
1F9A  9721 ;
1F9A  9722 ;       SUBTEST IPL CHECK
1F9A  9723 ;       :  Point to NOP command packet
1F9A  9724 ;       :  REPEAT
1F9A  9725 ;       :  :  SEND command packet byte at a time
1F9A  9726 ;       :  :  SET timer
1F9A  9727 ;       :  :  IF timer expired AND no response
1F9A  9728 ;       :  :  :  THEN
1F9A  9729 ;       :  :  :  :  REPORT no response error
1F9A  9730 ;       :  :  :  :  Exit test
1F9A  9731 ;       :  :  ENDIF
1F9A  9732 ;       :  : UNTIL all bytes sent
1F9A  9733 ;       :  ENDREPEAT
1F9A  9734 ;       :  SET IPL above read interrupt
1F9A  9735 ;       :  SET timer
1F9A  9736 ;       :  ENABLE read interrupt
1F9A  9737 ;       :  IF interrupt occurs before timeout
1F9A  9738 ;       :  :  THEN
1F9A  9739 ;       :  :  :  DISABLE read interrupt
1F9A  9740 ;       :  :  :  REPORT error
1F9A  9741 ;       :  :  :  Abort test
1F9A  9742 ;       :  :  ENDIF
1F9A  9743 ;       :  DISABLE read interrupt
1F9A  9744 ;       :  DECR IPL
1F9A  9745 ;       :  SET timer
1F9A  9746 ;       :  ENABLE read interrupt
1F9A  9747 ;       :  IF timer expires AND no interrupt
1F9A  9748 ;       :  :  THEN
1F9A  9749 ;       :  :  :  DISABLE read interrupt
1F9A  9750 ;       :  :  :  REPORT error
1F9A  9751 ;       :  :  :  Abort test
1F9A  9752 ;       :  ENDIF
1F9A  9753 ;       :  DISABLE read interrupt
1F9A  9754 ;       :  CLEAR IPL
1F9A  9755 ;      ENDSUBTEST IPL CHECK
1F9A  9756 ;
1F9A  9757 ;
1F9A  9758 ;
1F9A  9759 ;.page
1F9A  9760 ;-
1F9A  9761
```

```
                                1F9A  9762          $DS_BGNSUB
                                1F9A          T12_S14::
    00010030 9F   0000018C'EF    FA 1F9A                    CALLG   $S$, a#DS$BGNSUB
                                1FA5  9763          $DS_CLRVEC_S    VECTOR=#SCB$L_CSRD
             000000F0 8F         DD 1FA5                    PUSHL   #SCB$L_CSRD
         00010168 9F   01        FB 1FAB                    CALLS   #1, a#DS$CLRVEC
                                1FB2  9764          $DS_SETVEC_S    VECTOR=#SCB$L_CSRD,SRVADR=MREAD_SERVICE2
                   00           DD 1FB2                    PUSHL   #0
             000021AC'EF        DF 1FB4                    PUSHAL  MREAD_SERVICE2
             000000F0 8F        DD 1FBA                    PUSHL   #SCB$L_CSRD
         00010160 9F   03        FB 1FC0                    CALLS   #3, a#DS$SETVEC
             00000000'EF        94 1FC7  9765          CLRB    B_FLAGS                 ; clear byte flags
             00000001'EF        94 1FCD  9766          CLRB    B_FLAGS2                ; clear byte flags
             00000002'EF        94 1FD3  9767          CLRB    B_FLAGS3                ; clear byte flags
          54 FFFB6C20 8F        D0 1FD9  9768          MOVL    #DELAY_TIME1,R4         ; load send packet delay time
          55 0000030A'EF        9E 1FE0  9769          MOVAB   MB_NOP_CMD,R5           ; point to init command packet
                57              0E D0 1FE7  9770          MOVL    #14,R7                  ; load transfer byte count
             0000203D'EF        16 1FEA  9771          JSB     SEND_TU58               ; send command packet
       24 00000000'EF           00 E1 1FF0  9772          BBC     #V_CLOCK_FLAG,B_FLAGS,20$ ; br = no timeout error
                                1FF8  9773          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_IPL_ERR,PRLINK=NO_READY
             00001BEB'EF        DF 1FF8                    PUSHAL  NO_READY
             00001A04'EF        DF 1FFE                    PUSHAL  T_IPL_ERR
                   00           DD 2004                    PUSHL   #0
                   01           DD 2006                    PUSHL   #$ER
                                2008              ;;; TEST 12, SUBTEST 14, ERROR 1
         000100D0 9F   04        FB 2008                    CALLS   #$$M, a#DS$ERRHARD
                                200F  9774          $DS_BNCOMPLETE  10$
                03 50           E9 200F                    BLBC    R0, 10$
                                2012  9775          $DS_ABORT       TEST
                   50           D4 2012                    CLRL    R0                  ; SEND A WARNING TO THE SUPERVISOR
                                04 2014                    RET                         ; TERMINATE TEST
                                2015  9776 10$:    $DS_ABORT
         00010020 9F   6C        FA 2015                    CALLG   (AP), a#DS$ABORT
                                201C  9777
             00000000'EF        94 201C  9778 20$:    CLRB    B_FLAGS                 ; clear byte flags
                56              1D DB 2022  9779          MFPR    #PR750$_CSRD,R6         ; dump buffer to clear done     5.2
                                2025  9780          $DS_SETIPL_S    LEVEL=#^X17         ; set IPL above read interrupt
                   17           DD 2025                    PUSHL   #^X17
         00010178 9F   01        FB 2027                    CALLS   #1, a#DS$SETIPL
         19   FFF3CB00 8F        DA 202E  9781          MTPR    #DELAY_TIME3,#PR750$_NICR       ; load timer interval   5.2
         00000000'8F   10        DA 2035  9782          MTPR    #M_TRANSFER,#PR$_ICCS   ; transfer time to ICS
                   19   01       DA 203C  9783          MTPR    #1,#PR750$_NICR         ; load very long next interval  5.2
00000000'8F   80000041 8F        DA 203F  9784          MTPR    #<M_ERROR+M_ENABLE+M_RUN>,#PR$_ICCS ; start timer
         1C   00000040 8F        DA 204A  9785          MTPR    #M_ENABLE,#PR750$_CSRS  ; enable read interrupt         5.2
                                2051  9786 30$:    $DS_BREAK                       ; enable break
         00010058 9F   6E        FA 2051                    CALLG   (SP), a#DS$BREAK
      F1 00000000'EF           00 E1 2058  9787          BBC     #V_CLOCK_FLAG,B_FLAGS,30$ ; br = no timeout
      27 00000002'EF           02 E1 2060  9788          BBC     #V_RD_INT_FLAG,B_FLAGS3,50$ ; br = no interrupt
                1C              00 DA 2068  9789          MTPR    #0,#PR750$_CSRS         ; disable read interrupt        5.2
                                206B  9790          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_IPL_ERR,PRLINK=INT_ERR
             00001F3D'EF        DF 206B                    PUSHAL  INT_ERR
             00001A04'EF        DF 2071                    PUSHAL  T_IPL_ERR
                   00           DD 2077                    PUSHL   #0
                   02           DD 2079                    PUSHL   #$ER
                                207B              ;;; TEST 12, SUBTEST 14, ERROR 2
```

```
                000100D0 9F    04    FB  207B                        CALLS   #$$M, a#DS$ERRHARD
                                     2082  9791          $DS_BNCOMPLETE  40$
                      03 50    E9  2082                        BLBC    R0, 40$
                                     2085  9792          $DS_ABORT       TEST
                         50    D4  2085                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                               04  2087                        RET                     ; TERMINATE TEST
                                     2088  9793 40$:     $DS_ABORT
                00010020 9F    6C    FA  2088                        CALLG   (AP), a#DS$ABORT
                                     208F  9794
                53   00000000'FF    9E  208F  9795 50$:     MOVAB   a^A_BUFFER_BEGIN,R3     ; load buffer address
                         1C    00    DA  2096  9796          MTPR    #0,#PR750$_CSRS         ; disable read interrupt        5.2
                   00000002'EF    94  2099  9797          CLRB    B_FLAGS3                ; clear byte flags
                19   FF7E4CE0  8F    DA  209F  9798          MTPR    #DELAY_TIME7,#PR750$_NICR       ; load timer interval   5.2
                00000000'8F    10    DA  20A6  9799          MTPR    #M_TRANSFER,#PR$_ICCS   ; transfer time to ICS
                         19    01    DA  20AD  9800          MTPR    #1,#PR750$_NICR         ; load very long next interval  5.2
          00000000'8F    80000041  8F    DA  20B0  9801          MTPR    #<M_ERROR+M_ENABLE+M_RUN>,#PR$_ICCS ; start timer
                1C   00000040  8F    DA  20BB  9802          MTPR    #M_ENABLE,#PR750$_CSRS  ; enable read interrupt         5.2
                                     20C2  9803          $DS_SETIPL_S    LEVEL=#^X16     ; set IPL to allow read interrupt
                               16    DD  20C2                        PUSHL   #^X16
                00010178 9F    01    FB  20C4                        CALLS   #1, a#DS$SETIPL
                                     20CB  9804 60$:     $DS_BREAK                       ; enable break
                00010058 9F    6E    FA  20CB                        CALLG   (SP), a#DS$BREAK
             2F 00000002'EF    02    E0  20D2  9805          BBS     #V_RD_INT_FLAG,B_FLAGS3,80$ ; br = interrupt
             E9 00000000'EF    00    E1  20DA  9806          BBC     #V_CLOCK_FLAG,B_FLAGS,60$ ; br = no timeout
                         1C    00    DA  20E2  9807          MTPR    #0,#PR750$_CSRS         ; disable read interrupt        5.2
                                     20E5  9808          $DS_ERRHARD_S   ,UNIT=#0,MSGADR=T_IPL_ERR,PRLINK=NO_INT_ERR
                   00001F4B'EF    DF  20E5                        PUSHAL  NO_INT_ERR
                   00001A04'EF    DF  20EB                        PUSHAL  T_IPL_ERR
                               00    DD  20F1                        PUSHL   #0
                               03    DD  20F3                        PUSHL   #$ER
                                     20F5        ;;; TEST 12, SUBTEST 14, ERROR 3
                000100D0 9F    04    FB  20F5                        CALLS   #$$M, a#DS$ERRHARD
                                     20FC  9809          $DS_BNCOMPLETE  70$
                      03 50    E9  20FC                        BLBC    R0, 70$
                                     20FF  9810          $DS_ABORT       TEST
                         50    D4  20FF                        CLRL    R0              ; SEND A WARNING TO THE SUPERVISOR
                               04  2101                        RET                     ; TERMINATE TEST
                                     2102  9811 70$:     $DS_ABORT
                00010020 9F    6C    FA  2102                        CALLG   (AP), a#DS$ABORT
                                     2109  9812
                         1C    00    DA  2109  9813 80$:     MTPR    #0,#PR750$_CSRS         ; disable interrupt             5.2
                                     210C  9814          $DS_SETIPL_S    LEVEL=#0        ; restore IPL
                               00    DD  210C                        PUSHL   #0
                00010178 9F    01    FB  210E                        CALLS   #1, a#DS$SETIPL
                                     2115  9815
                                     2115  9816          $DS_ENDSUB
                                     2115        T12_S14_X:
      00010038 9F    0000018C'EF    FA  2115                        CALLG   $S$, a#DS$ENDSUB
                                     2120  9817
                                     2120  9818          $DS_CLRVEC_S    VECTOR=#SCB$L_TIMER
                   000000C0  8F    DD  2120                        PUSHL   #SCB$L_TIMER
                00010168 9F    01    FB  2126                        CALLS   #1, a#DS$CLRVEC
                                     212D  9819          $DS_CLRVEC_S    VECTOR=#SCB$L_CSRD
                   000000F0  8F    DD  212D                        PUSHL   #SCB$L_CSRD
                00010168 9F    01    FB  2133                        CALLS   #1, a#DS$CLRVEC
```

```
                          213A  9820          $DS_CLRVEC_S    VECTOR=#SCB$L_CSTD
          000000F4 8F     DD  213A                  PUSHL   #SCB$L_CSTD
00010168  9F   01     FB   2140                  CALLS   #1, a#DS$CLRVEC
                          2147  9821
                          2147  9822          $DS_ENDTEST
               50   01    D0  2147                  MOVL    #1, R0          ; NORMAL EXIT
                          214A          TEST_012_X::
00010058  9F   6E     FA   214A                  CALLG   (SP), a#DS$BREAK
                          04  2151                  RET                     ; RETURN TO TEST SEQUENCER
                          2152  9823          $DS_ENDMOD
                     00000000                        .PSECT  $TSTCNT, NOEXE, NOWRT, OVR, LONG
                     0000000C  0000                  .LONG   $TN
                          0004  9824
                          0004  9825          .END
```

```
$$$                     = 0000018C R     05
$$ARGS                  = 0000000A
$$E                     = 00000004
$$M                     = 00000004
$$N                     = 00000000
$$S                     = FFFFFFFF
$$T1                    = 0000002C
$ENV                    = 00000001  G
$ER                     = FFFFFFFF
$MO                     = 00000001  G
$S$                     = 0000018C R     05
$ST                     = 00000000
$TN                     = 0000000C
ALL                     = 00000009  G
A_BUFFER_BEGIN            ********    X   01
BASE_009                  00000000 R     03
BASE_010                  00000000 R     06
BASE_011                  00000000 R     07
BASE_012                  00000000 R     08
BIT...                  = 00000005
BLOCK_00                = 00000000
BLOCK_01                = 00000001
BLOCK_02                = 00000002
BLOCK_04                = 00000004
BLOCK_05                = 00000005
BLOCK_06                = 00000006
BLOCK_0A                = 0000000A
BLOCK_0C                = 0000000C
BLOCK_0D                = 0000000D
BLOCK_0E                = 0000000E
BLOCK_0F                = 0000000F
BLOCK_15                = 00000015
BLOCK_5A                = 0000005A
BLOCK_80                = 00000080
BLOCK_8F                = 0000008F
BUFFER_SIZE             = 00000600
BUF_LIM                   00000013 R     01
BYTE_COUNT_00           = 00000000
BYTE_COUNT_01           = 00000001
BYTE_COUNT_02           = 00000002
BYTE_COUNT_04           = 00000004
BYTE_COUNT_0A           = 0000000A
BYTE_COUNT_12           = 00000012
BYTE_COUNT_1A           = 0000001A
BYTE_COUNT_64           = 00000064
BYTE_COUNT_74           = 00000074
BYTE_COUNT_80           = 00000080
BYTE_COUNT_F4           = 000000F4
B_CONTINUE                00000023 R     01
B_COUNT                   00000003 R     01
B_COUNT1                  00000004 R     01
B_COUNT2                  00000005 R     01
B_DATA_PKT_1              000006EC R     01
B_DATA_PKT_10             00000AAB R     01
B_DATA_PKT_11             00000B2F R     01
B_DATA_PKT_12             00000BA7 R     01
B_DATA_PKT_13             00000C2B R     01
B_DATA_PKT_14             00000CAF R     01
B_DATA_PKT_15             00000D33 R     01
B_DATA_PKT_16             00000DB7 R     01
B_DATA_PKT_17             00000E3B R     01
B_DATA_PKT_18             00000EBF R     01
B_DATA_PKT_19             00000F43 R     01
B_DATA_PKT_2              0000070A R     01
B_DATA_PKT_20             00000FC7 R     01
B_DATA_PKT_21             0000104B R     01
B_DATA_PKT_22             000010B3 R     01
B_DATA_PKT_23             00001137 R     01
B_DATA_PKT_24             000011BB R     01
B_DATA_PKT_25             0000123F R     01
B_DATA_PKT_26             000012A7 R     01
B_DATA_PKT_3              0000078E R     01
B_DATA_PKT_4              00000812 R     01
B_DATA_PKT_5              00000817 R     01
B_DATA_PKT_6              0000089B R     01
B_DATA_PKT_7              0000091F R     01
B_DATA_PKT_8              000009A3 R     01
B_DATA_PKT_9              00000A27 R     01
B_DIAGNOSE_CMD            00000040 R     01
B_END_PACKET_1            000005D4 R     01
B_END_PACKET_10           00000652 R     01
B_END_PACKET_2            000005E2 R     01
B_END_PACKET_3            000005F0 R     01
B_END_PACKET_4            000005FE R     01
B_END_PACKET_5            0000060C R     01
B_END_PACKET_6            0000061A R     01
B_END_PACKET_7            00000628 R     01
B_END_PACKET_8            00000636 R     01
B_END_PACKET_9            00000644 R     01
B_FLAGS                   00000000 R     01
B_FLAGS2                  00000001 R     01
B_FLAGS3                  00000002 R     01
B_INIT_CMD                00000024 R     01
B_INIT_DRIVE              0000001F R     01
B_NOP_CMD                 00000032 R     01
B_POS_1_CMD               000002EE R     01
B_READ_10_CMD             00000174 R     01
B_READ_11_CMD             00000190 R     01
B_READ_12_CMD             000001AC R     01
B_READ_13_CMD             000001C8 R     01
B_READ_14_CMD             000001E4 R     01
B_READ_15_CMD             00000200 R     01
B_READ_16_CMD             0000021C R     01
B_READ_17_CMD             00000238 R     01
B_READ_18_CMD             00000254 R     01
B_READ_19_CMD             00000270 R     01
B_READ_1_CMD              0000004E R     01
B_READ_20_CMD             0000028C R     01
B_READ_21_CMD             000002A8 R     01
B_READ_22_CMD             000002C4 R     01
```

```
B_READ_23_CMD                   000002D2 R      01        CHECKSUM_14                     = 00000014
B_READ_24_CMD                   000002E0 R      01        CHECKSUM_15                     = 00000015
B_READ_2_CMD                    00000078 R      01        CHECKSUM_16                     = 00000016
B_READ_3_CMD                    00000094 R      01        CHECKSUM_19                     = 00000019
B_READ_4_CMD                    000000B0 R      01        CHECKSUM_1A                     = 0000001A
B_READ_5_CMD                    000000E8 R      01        CHECKSUM_1C                     = 0000001C
B_READ_6_CMD                    000000F6 R      01        CHECKSUM_1D                     = 0000001D
B_READ_7_CMD                    0000012E R      01        CHECKSUM_2D                     = 0000002D
B_READ_8_CMD                    0000013C R      01        CHECKSUM_36                     = 00000036
B_READ_9_CMD                    00000158 R      01        CHECKSUM_41                     = 00000041
B_RESPONSE                      00000012 R      01        CHECKSUM_42                     = 00000042
B_WRITE_10_CMD                  00000120 R      01        CHECKSUM_43                     = 00000043
B_WRITE_11_CMD                  0000014A R      01        CHECKSUM_54                     = 00000054
B_WRITE_12_CMD                  00000166 R      01        CHECKSUM_5C                     = 0000005C
B_WRITE_13_CMD                  00000182 R      01        CHECKSUM_6E                     = 0000006E
B_WRITE_14_CMD                  0000019E R      01        CHECKSUM_6F                     = 0000006F
B_WRITE_15_CMD                  000001BA R      01        CHECKSUM_72                     = 00000072
B_WRITE_16_CMD                  000001D6 R      01        CHECKSUM_75                     = 00000075
B_WRITE_17_CMD                  000001F2 R      01        CHECKSUM_79                     = 00000079
B_WRITE_18_CMD                  0000020E R      01        CHECKSUM_80                     = 00000080
B_WRITE_19_CMD                  0000022A R      01        CHECKSUM_82                     = 00000082
B_WRITE_1_CMD                   0000005C R      01        CHECKSUM_83                     = 00000083
B_WRITE_20_CMD                  00000246 R      01        CHECKSUM_84                     = 00000084
B_WRITE_21_CMD                  00000262 R      01        CHECKSUM_85                     = 00000085
B_WRITE_22_CMD                  0000027E R      01        CHECKSUM_88                     = 00000088
B_WRITE_23_CMD                  0000029A R      01        CHECKSUM_89                     = 00000089
B_WRITE_24_CMD                  000002B6 R      01        CHECKSUM_8A                     = 0000008A
B_WRITE_2_CMD                   0000006A R      01        CHECKSUM_8B                     = 0000008B
B_WRITE_3_CMD                   00000086 R      01        CHECKSUM_8C                     = 0000008C
B_WRITE_4_CMD                   000000A2 R      01        CHECKSUM_8D                     = 0000008D
B_WRITE_5_CMD                   000000BE R      01        CHECKSUM_90                     = 00000090
B_WRITE_6_CMD                   000000CC R      01        CHECKSUM_91                     = 00000091
B_WRITE_7_CMD                   000000DA R      01        CHECKSUM_92                     = 00000092
B_WRITE_8_CMD                   00000104 R      01        CHECKSUM_93                     = 00000093
B_WRITE_9_CMD                   00000112 R      01        CHECKSUM_94                     = 00000094
B_ZEROS                         00000021 R      01        CHECKSUM_95                     = 00000095
CEP_FUNCTIONAL              =   00000000                  CHECKSUM_98                     = 00000098
CEP_REPAIR                  =   00000001                  CHECKSUM_A6                     = 000000A6
CHECKSUM_01                 =   00000001                  CHECKSUM_A9                     = 000000A9
CHECKSUM_02                 =   00000002                  CHECKSUM_AA                     = 000000AA
CHECKSUM_03                 =   00000003                  CHECKSUM_AB                     = 000000AB
CHECKSUM_04                 =   00000004                  CHECKSUM_AE                     = 000000AE
CHECKSUM_05                 =   00000005                  CHECKSUM_BA                     = 000000BA
CHECKSUM_08                 =   00000008                  CHECKSUM_BF                     = 000000BF
CHECKSUM_09                 =   00000009                  CHECKSUM_C0                     = 000000C0
CHECKSUM_0A                 =   0000000A                  CHECKSUM_C1                     = 000000C1
CHECKSUM_0B                 =   0000000B                  CHECKSUM_C2                     = 000000C2
CHECKSUM_0C                 =   0000000C                  CHECKSUM_C5                     = 000000C5
CHECKSUM_0D                 =   0000000D                  CHECKSUM_C9                     = 000000C9
CHECKSUM_0E                 =   0000000E                  CHECKSUM_DE                     = 000000DE
CHECKSUM_0F                 =   0000000F                  CHECKSUM_DF                     = 000000DF
CHECKSUM_10                 =   00000010                  CHECKSUM_E0                     = 000000E0
CHECKSUM_11                 =   00000011                  CHECKSUM_E5                     = 000000E5
CHECKSUM_12                 =   00000012                  CHECKSUM_E8                     = 000000E8
CHECKSUM_13                 =   00000013                  CHECKSUM_F4                     = 000000F4
```

```
CHECKSUM_F7                     = 000000F7
CHECKSUM_FA                     = 000000FA
CHECKSUM_FC                     = 000000FC
CHECK_PACKET                      0000213B R      01
CLEAR_BUFFER                      00002134 R      01
COMMAND_FLAG                    = 00000002
COMMAND_TBL_1                     0000132B R      01
COMMAND_TBL_2                     00001397 R      01
COMMAND_TBL_3                     000013D3 R      01
COMMAND_TBL_4                     000014E3 R      01
COMMAND_TBL_5                     00001563 R      01
CONTINUE_FLAG                   = 00000010
DATA_0000                       = 00000000
DATA_0001                       = 00000001
DATA_0004                       = 00000004
DATA_000F                       = 0000000F
DATA_0015                       = 00000015
DATA_0080                       = 00000080
DATA_009                          00000014 R      03
DATA_00AA                       = 000000AA
DATA_00FF                       = 000000FF
DATA_010                          0000001C R      06
DATA_0100                       = 00000100
DATA_0101                       = 00000101
DATA_011                          00000020 R      07
DATA_0115                       = 00000115
DATA_012                          00000028 R      08
DATA_0180                       = 00000180
DATA_0204                       = 00000204
DATA_0206                       = 00000206
DATA_025A                       = 0000025A
DATA_0400                       = 00000400
DATA_0604                       = 00000604
DATA_0605                       = 00000605
DATA_0606                       = 00000606
DATA_065A                       = 0000065A
DATA_0800                       = 00000800
DATA_0960                       = 00000960
DATA_1400                       = 00001400
DATA_1D14                       = 00001D14
DATA_4A77                       = 00004A77
DATA_774A                       = 0000774A
DATA_7D09                       = 00007D09
DATA_ERR_CONT                     00001E4D R      01
DATA_ERR_DATA                     00001E75 R      01
DATA_ERR_END                      00001E9D R      01
DATA_FFFF                       = 0000FFFF
DATA_FLAG                       = 00000001
DEFAULT                         = 00000000  G
DELAY_TIME1                     = FFFB6C20
DELAY_TIME2                     = FFF85EE0
DELAY_TIME3                     = FFF3CB00
DELAY_TIME4                     = FFF0BDC0
DELAY_TIME5                     = FFE17B80
DELAY_TIME6                     = FFC2F700
DELAY_TIME7                     = FF7E4CE0
DELAY_TIME8                     = FAEF00C0
DIAGNOSE                        = 00000007
DS$ABORT                          00010020
DS$ASKADR                         00010090
DS$ASKDATA                        00010080
DS$ASKLGCL                        00010098
DS$ASKSTR                         000100A0
DS$ASKVLD                         00010088
DS$ATTACH                         000101A8
DS$BGNSUB                         00010030
DS$BRANCH                         000100A8
DS$BREAK                          00010058
DS$CANWAIT                        00010070
DS$CHANNEL                        00010180
DS$CKLOOP                         00010040
DS$CLRVEC                         00010168
DS$CNTRLC                         00010078
DS$CVTREG                         000100B0
DS$ENDPASS                        00010010
DS$ENDSUB                         00010038
DS$ERRDEV                         000100C8
DS$ERRHARD                        000100D0
DS$ERRPREP                        00010108
DS$ERRSOFT                        000100D8
DS$ERRSYS                         000100C0
DS$ESCAPE                         00010050
DS$FREEDBGSYM                     000101B8
DS$GETBUF                         00010120
DS$GETMEM                         00010130
DS$GETTERM                        000101C8
DS$GPHARD                         00010018
DS$HELP                           000101B0
DS$INITSCB                        00010170
DS$INLOOP                         00010048
DS$K_ERROR                      = 00000002
DS$K_NORMAL                     = 00000001
DS$K_SEVERE                     = 00000004
DS$K_SUBSYS                     = 00000066
DS$K_WARNING                    = 00000000
DS$LOAD                           00010198
DS$LOADPCS                        000101C0
DS$MAPDBGBLOCK                    00010118
DS$MEMSIZE                        000101D8
DS$MMOFF                          00010158
DS$MMON                           00010150
DS$MOVPHY                         00010148
DS$MOVVRT                         00010140
DS$PARSE                          000100B8
DS$PRINTB                         000100E0
DS$PRINTF                         000100F0
DS$PRINTS                         000100F8
DS$PRINTSIG                       00010100
DS$PRINTX                         000100E8
DS$PROBE                          000101A0
```

```
DS$RELBUF                       00010128
DS$RELMEM                       00010138
DS$SERVICE_DISPATCHER           000101D0
DS$SETIPL                       00010178
DS$SETMAP                       00010188
DS$SETPRIEXV                    00010110
DS$SETVEC                       00010160
DS$SHOCHAN                      00010190
DS$SUMMARY                      00010028
DS$WAITMS                       00010060
DS$WAITUS                       00010068
DS$_ARITH                     = 006600D0
DS$_ASBE                      = 00660118
DS$_BADLINK                   = 006600F0
DS$_BADTYPE                   = 006600E8
DS$_BIIC                      = 00660120
DS$_CHME                      = 006600A8
DS$_CHMK                      = 006600E0
DS$_DEVNAME                   = 00660108
DS$_ERROR                     = 00660002
DS$_FHWE                      = 00660068
DS$_FRAGBUF                   = 00660080
DS$_ICBUSY                    = 006600C8
DS$_ICERR                     = 006600C0
DS$_IHWE                      = 00660060
DS$_ILLCHAR                   = 00660018
DS$_ILLPAGCNT                 = 00660078
DS$_ILLUNIT                   = 00660100
DS$_INSFMEM                   = 00660050
DS$_IPL2HI                    = 006600B8
DS$_IVADDR                    = 00660040
DS$_IVVECT                    = 00660038
DS$_KRNLSTK                   = 00660090
DS$_LOGIC                     = 00660070
DS$_MCHK                      = 00660088
DS$_MMOFF                     = 00660058
DS$_NEEDUNIT                  = 006600F8
DS$_NODE                      = 00660128
DS$_NOPCS                     = 00660110
DS$_NORMAL                    = 00660001
DS$_NOSUPPORT                 = 006600B1
DS$_NOTDON                    = 00660030
DS$_NOTIMP                    = 006600B0
DS$_NULLSTR                   = 00660010
DS$_OVERFLOW                  = 00660008
DS$_POWER                     = 00660098
DS$_PROGERR                   = 00660020
DS$_SEVERE                    = 00660004
DS$_TRANSL                    = 006600A0
DS$_TRUNCATE                  = 00660028
DS$_UNEXPINT                  = 006600D8
DS$_VASFULL                   = 00660048
DS$_WARNING                   = 00660000
DUMP_14                         00002227 R      01
DUMP_PKT                        000021E7 R      01
END_CODE                      = 00000040
END_FLAG                      = 00000002
ENV$M_DOMAIN                  = 00000002
ENV$M_LEVEL                   = 00000001
ENV$M_SUPER                   = 000003FC
ENV$S_DOMAIN                  = 00000001
ENV$S_LEVEL                   = 00000001
ENV$S_SUPER                   = 00000008
ENV$V_DOMAIN                  = 00000001
ENV$V_LEVEL                   = 00000000
ENV$V_SUPER                   = 00000002
ENV$_CPU                      = 00000000
ENV$_FUNCTIONAL               = 00000000
ENV$_REPAIR                   = 00000001
ENV$_SUPER                    = 00000001
ENV$_SYSTEM                   = 00000001
ERR$_MSGADR                   = 0000000C
ERR$_NARGS                    = 0000000A
ERR$_NUM                      = 00000004
ERR$_P1                       = 00000014
ERR$_P2                       = 00000018
ERR$_P3                       = 0000001C
ERR$_P4                       = 00000020
ERR$_P5                       = 00000024
ERR$_P6                       = 00000028
ERR$_POINTER                  = 00000010
ERR$_UNIT                     = 00000008
FIND_END                        0000223D R      01
HALT                          = 00000004  G
INITIALIZE                    = 00000001
INIT_FLAG                     = 00000004
INIT_SEQUENCE                   00001F59 R      01
INT_ERR                         00001F3D R      01
IPR                           = 00000006  G
L_COUNT                         00000006 R      01
L_COUNT1                        0000000A R      01
L_COUNT3                        0000000E R      01
MANUAL                        = 00000001  G
MB_DIAGNOSE_CMD                 00000318 R      01
MB_END_PACKET_1                 00000660 R      01
MB_END_PACKET_10                000006DE R      01
MB_END_PACKET_2                 0000066E R      01
MB_END_PACKET_3                 0000067C R      01
MB_END_PACKET_4                 0000068A R      01
MB_END_PACKET_5                 00000698 R      01
MB_END_PACKET_6                 000006A6 R      01
MB_END_PACKET_7                 000006B4 R      01
MB_END_PACKET_8                 000006C2 R      01
MB_END_PACKET_9                 000006D0 R      01
MB_INIT_CMD                     000002FC R      01
MB_NOP_CMD                      0000030A R      01
MB_POS_1_CMD                    000005C6 R      01
MB_READ_10_CMD                  0000044C R      01
MB_READ_11_CMD                  00000468 R      01
MB_READ_12_CMD                  00000484 R      01
```

```
MB_READ_13_CMD                  000004A0 R      01      MREAD_SERVICE                   0000216C R      01
MB_READ_14_CMD                  000004BC R      01      MREAD_SERVICE2                  000021AC R      01
MB_READ_15_CMD                  000004D8 R      01      MRECEIVE_TU58                   000020C8 R      01
MB_READ_16_CMD                  000004F4 R      01      MSG_009                         00000002 R      03
MB_READ_17_CMD                  00000510 R      01      MSG_010                         00000002 R      06
MB_READ_18_CMD                  0000052C R      01      MSG_011                         00000002 R      07
MB_READ_19_CMD                  00000548 R      01      MSG_012                         00000002 R      08
MB_READ_1_CMD                   00000326 R      01      MSG_1                           00001AD6 R      01
MB_READ_20_CMD                  00000564 R      01      MSG_2                           00001AE6 R      01
MB_READ_21_CMD                  00000580 R      01      M_CLOCK_FLAG                =   00000001
MB_READ_22_CMD                  0000059C R      01      M_DATA_FLAG                 =   00000004
MB_READ_23_CMD                  000005AA R      01      M_ENABLE                    =   00000040
MB_READ_24_CMD                  000005B8 R      01      M_END_FLAG                  =   00000008
MB_READ_2_CMD                   00000350 R      01      M_ERROR                     =   80000000
MB_READ_3_CMD                   0000036C R      01      M_INTERRUPT                 =   00000080
MB_READ_4_CMD                   00000388 R      01      M_RD_INT_FLAG               =   00000004
MB_READ_5_CMD                   000003C0 R      01      M_RECEIVE_FLAG              =   00000002
MB_READ_6_CMD                   000003CE R      01      M_REPEAT_CHECK              =   00000004
MB_READ_7_CMD                   00000406 R      01      M_REPEAT_SEND               =   00000002
MB_READ_8_CMD                   00000414 R      01      M_RUN                       =   00000001
MB_READ_9_CMD                   00000430 R      01      M_SDONE_FLAG                =   00000002
MB_WRITE_10_CMD                 000003F8 R      01      M_SEND_FLAG                 =   00000010
MB_WRITE_11_CMD                 00000422 R      01      M_TRANSFER                  =   00000010
MB_WRITE_12_CMD                 0000043E R      01      NOT_USED                    =   00000000
MB_WRITE_13_CMD                 0000045A R      01      NO_INT_ERR                      00001F4B R      01
MB_WRITE_14_CMD                 00000476 R      01      NO_OPERATION                =   00000000
MB_WRITE_15_CMD                 00000492 R      01      NO_READY                        00001BEB R      01
MB_WRITE_16_CMD                 000004AE R      01      PAR$M_ATDEF                 =   00000010
MB_WRITE_17_CMD                 000004CA R      01      PAR$M_ATHI                  =   00000008
MB_WRITE_18_CMD                 000004E6 R      01      PAR$M_ATLO                  =   00000004
MB_WRITE_19_CMD                 00000502 R      01      PAR$M_NODEF                 =   00000002
MB_WRITE_1_CMD                  00000334 R      01      PAR$V_ATDEF                 =   00000004
MB_WRITE_20_CMD                 0000051E R      01      PAR$V_ATHI                  =   00000003
MB_WRITE_21_CMD                 0000053A R      01      PAR$V_ATLO                  =   00000002
MB_WRITE_22_CMD                 00000556 R      01      PAR$V_NODEF                 =   00000001
MB_WRITE_23_CMD                 00000572 R      01      PAR$_BIN                    =   00000002
MB_WRITE_24_CMD                 0000058E R      01      PAR$_DEC                    =   0000000A
MB_WRITE_2_CMD                  00000342 R      01      PAR$_HEX                    =   00000010
MB_WRITE_3_CMD                  0000035E R      01      PAR$_NO                     =   00000000
MB_WRITE_4_CMD                  0000037A R      01      PAR$_OCT                    =   00000008
MB_WRITE_5_CMD                  00000396 R      01      PAR$_YES                    =   00000001
MB_WRITE_6_CMD                  000003A4 R      01      PCS                         =   00000008  G
MB_WRITE_7_CMD                  000003B2 R      01      POSITION                    =   00000005
MB_WRITE_8_CMD                  000003DC R      01      POWER_FAIL                  =   00000003  G
MB_WRITE_9_CMD                  000003EA R      01      PR$_ICCS                        ********    X   01
MCHK                        =   00000005  G             PR750$_CSRD                 =   0000001D
MCOMMAND_TBL_1                  000015B3 R      01      PR750$_CSRS                 =   0000001C
MCOMMAND_TBL_2                  0000161F R      01      PR750$_CSTD                 =   0000001F
MCOMMAND_TBL_3                  0000165B R      01      PR750$_CSTS                 =   0000001E
MCOMMAND_TBL_4                  0000176B R      01      PR750$_NICR                 =   00000019
MCOMMAND_TBL_5                  000017EB R      01      READ                        =   00000002
MINIT_SEQUENCE                  00001FCB R      01      READ_SERVICE                    00002164 R      01
MODIFIER_00                 =   00000000                READ_SERVICE2                   000021A0 R      01
MODIFIER_01                 =   00000001                RECEIVE_TU58                    00002083 R      01
MODIFIER_80                 =   00000080                REC_ERR                         00001EB4 R      01
```

```
SCB$L_ACCESS                    00000020
SCB$L_ARITH                     00000034
SCB$L_BREAK                     0000002C
SCB$L_CHME                      00000044
SCB$L_CHMK                      00000040
SCB$L_CHMS                      00000048
SCB$L_CHMU                      0000004C
SCB$L_COMPAT                    00000030
SCB$L_CSRD                    = 000000F0
SCB$L_CSTD                    = 000000F4
SCB$L_KNLSTK                    00000008
SCB$L_MACHCHK                   00000004
SCB$L_OPCCUS                    00000014
SCB$L_OPCDEC                    00000010
SCB$L_POWER                     0000000C
SCB$L_RADRMOD                   0000001C
SCB$L_ROPRAND                   00000018
SCB$L_RXDB                      000000F8
SCB$L_SFTLVL1                   00000084
SCB$L_SFTLVL10                  000000A8
SCB$L_SFTLVL11                  000000AC
SCB$L_SFTLVL12                  000000B0
SCB$L_SFTLVL13                  000000B4
SCB$L_SFTLVL14                  000000B8
SCB$L_SFTLVL15                  000000BC
SCB$L_SFTLVL2                   00000088
SCB$L_SFTLVL3                   0000008C
SCB$L_SFTLVL4                   00000090
SCB$L_SFTLVL5                   00000094
SCB$L_SFTLVL6                   00000098
SCB$L_SFTLVL7                   0000009C
SCB$L_SFTLVL8                   000000A0
SCB$L_SFTLVL9                   000000A4
SCB$L_TBIT                      00000028
SCB$L_TIMER                     000000C0
SCB$L_TRANSL                    00000024
SCB$L_TXDB                      000000FC
SCB$L_ZERO                      00000000
SEND_INT_ERR                    00001AC9 R      01
SEND_TU58                       0000203D R      01
SEP_FUNCTIONAL                = 00000002
SEP_REPAIR                    = 00000003
SEQUENCE_H                    = 00000000
SEQUENCE_L                    = 00000000
SIZ...                        = 00000001
SUCCESS_CODE                  = 00000000
SUMMARY_STAT_H                = 00000000
SUMMARY_STAT_L                = 00000000
SWITCH_00                     = 00000000
SWITCH_08                     = 00000008
SYS$ALLOC                       00010238
SYS$ASCTIM                      00010248
SYS$ASSIGN                      00010250
SYS$BINTIM                      00010258
SYS$CANCEL                      00010260
SYS$CANTIM                      00010268
SYS$CLOSE                       000105B8
SYS$CLREF                       00010298
SYS$CONNECT                     000105C0
SYS$DALLOC                      000102D8
SYS$DASSGN                      000102E0
SYS$DISCONNECT                  000105D0
SYS$FAO                         00010350
SYS$FAOL                        00010358
SYS$GET                         00010580
SYS$GETCHN                      000104C8
SYS$GETTIM                      00010378
SYS$LKWSET                      000103A0
SYS$NUMTIM                      000103B8
SYS$OPEN                        00010608
SYS$QIO                         000103C8
SYS$QIOW                        00010200
SYS$READ                        00010590
SYS$READEF                      000103D0
SYS$SETAST                      000103F8
SYS$SETEF                       00010400
SYS$SETIMR                      00010420
SYS$SETPRI                      00010428
SYS$SETPRT                      00010430
SYS$SETRWM                      00010438
SYS$SETSWM                      00010448
SYS$ULKPAG                      00010460
SYS$ULWSET                      00010468
SYS$UNWIND                      00010470
SYS$WAITFR                      00010478
SYS$WFLAND                      00010488
SYS$WFLOR                       00010490
T10_S1                          00000131 RG     06
T10_S10                         000014D8 RG     06
T10_S10_X                       00001854 R      06
T10_S11                         0000185F RG     06
T10_S11_X                       00001BB1 R      06
T10_S12                         00001BBC RG     06
T10_S12_X                       00001DEB R      06
T10_S13                         00001DF6 RG     06
T10_S13_X                       00001F86 R      06
T10_S14                         00001F91 RG     06
T10_S14_X                       00002105 R      06
T10_S1_X                        00000436 R      06
T10_S2                          00000441 RG     06
T10_S2_X                        00000625 R      06
T10_S3                          00000630 RG     06
T10_S3_X                        00000786 R      06
T10_S4                          00000791 RG     06
T10_S4_X                        00000975 R      06
T10_S5                          00000980 RG     06
T10_S5_X                        00000AD6 R      06
T10_S6                          00000AE1 RG     06
T10_S6_X                        00000CBB R      06
T10_S7                          00000CC6 RG     06
```

```
T10_S7_X                        00000E0E R      06        TIMER_SERVICE                   00002150 R      01
T10_S8                          00000E19 RG     06        TU58                          = 00000002  G
T10_S8_X                        00001186 R      06        T_ACT_CONT                      00001C68 R      01
T10_S9                          00001191 RG     06        T_ACT_DATA                      00001C9B R      01
T10_S9_X                        000014CD R      06        T_ACT_END                       00001DB5 R      01
T11_S1                          00000135 RG     07        T_ACT_REC                       00001E18 R      01
T11_S1_X                        0000022D R      07        T_BAD_CONT                      00001BF8 R      01
T11_S2                          00000238 RG     07        T_BAD_DATA                      00001C37 R      01
T11_S2_X                        00000330 R      07        T_BAD_END                       00001C19 R      01
T11_S3                          0000033B RG     07        T_DUMP_14                       00001E42 R      01
T11_S3_X                        00000433 R      07        T_DUMP_HDR                      00001CBE R      01
T12_S1                          0000013D RG     08        T_DUMP_NOXOR                    00001CF2 R      01
T12_S10                         000014E4 RG     08        T_DUMP_XOR                      00001CDA R      01
T12_S10_X                       00001860 R      08        T_EMPTY_BUF                     00001D93 R      01
T12_S11                         0000186B RG     08        T_EXP_CONT                      00001C56 R      01
T12_S11_X                       00001BBD R      08        T_EXP_DATA                      00001C7A R      01
T12_S12                         00001BC8 RG     08        T_INIT1_ERR                     0000183B R      01
T12_S12_X                       00001DF7 R      08        T_INIT2_ERR                     00001865 R      01
T12_S13                         00001E02 RG     08        T_INT_ERR                       00001A2C R      01
T12_S13_X                       00001F8F R      08        T_IPL_ERR                       00001A04 R      01
T12_S14                         00001F9A RG     08        T_MSG_1                         00001AF6 R      01
T12_S14_X                       00002115 R      08        T_MSG_2                         00001B28 R      01
T12_S1_X                        00000442 R      08        T_NOP_ERR                       000018AD R      01
T12_S2                          0000044D RG     08        T_NO_INT_ERR                    00001A65 R      01
T12_S2_X                        00000631 R      08        T_NO_READY                      00001BB9 R      01
T12_S3                          0000063C RG     08        T_OVERWRITE                     00001B56 R      01
T12_S3_X                        00000792 R      08        T_RD_BLK_ERR                    000018EB R      01
T12_S4                          0000079D RG     08        T_RD_INT_ERR                    0000199F R      01
T12_S4_X                        00000981 R      08        T_RD_MOD_ERR                    0000197A R      01
T12_S5                          0000098C RG     08        T_RD_REC_ERR                    00001931 R      01
T12_S5_X                        00000AE2 R      08        T_REC_CONT                      00001D47 R      01
T12_S6                          00000AED RG     08        T_REC_DATA                      00001D68 R      01
T12_S6_X                        00000CC7 R      08        T_REC_END                       00001D2E R      01
T12_S7                          00000CD2 RG     08        T_REC_ERR                       00001D04 R      01
T12_S7_X                        00000E1A R      08        T_SEND_INT_ERR                  00001A89 R      01
T12_S8                          00000E25 RG     08        T_SLF_DIAG_ERR                  00001888 R      01
T12_S8_X                        00001192 R      08        T_UNREC_DATA                    00001DF4 R      01
T12_S9                          0000119D RG     08        T_WR_BLK_ERR                    000018C8 R      01
T12_S9_X                        000014D9 R      08        T_WR_INT_ERR                    000019D1 R      01
T9_S1                           00000129 RG     03        T_WR_MOD_ERR                    00001954 R      01
T9_S1_X                         00000221 R      03        T_WR_REC_ERR                    0000190D R      01
T9_S2                           0000022C RG     03        UNIT_0                        = 00000000
T9_S2_X                         00000324 R      03        V_CLOCK_FLAG                  = 00000000
T9_S3                           0000032F RG     03        V_DATA_FLAG                   = 00000002
T9_S3_X                         00000427 R      03        V_DONE                        = 00000007
TEMP5                           00000017 R      01        V_DONE_FLAG                   = 00000000
TEMP7                           0000001B R      01        V_END_FLAG                    = 00000003
TEST_009                        00000018 RG     03        V_RD_INT_FLAG                 = 00000002
TEST_009_X                      00000442 RG     03        V_READY                       = 00000007
TEST_010                        00000020 RG     06        V_RECEIVE_FLAG                = 00000001
TEST_010_X                      0000213A RG     06        V_REPEAT_CHECK                = 00000002
TEST_011                        00000024 RG     07        V_REPEAT_SEND                 = 00000001
TEST_011_X                      0000044E RG     07        V_RESPONSE_FLAG               = 00000004
TEST_012                        0000002C RG     08        V_RUN                         = 00000000
TEST_012_X                      0000214A RG     08        V_SDONE_FLAG                  = 00000001
```

```
V_SEND_FLAG                     = 00000004
V_TRANSFER                      = 00000004
WCS                             = 00000007  G
WRITE                           = 00000003
WRITE_SERVICE                     000021D4 R     01
XOFF_FLAG                       = 00000013
XON_FLAG                        = 00000011
```

Psect synopsis

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
ECKAXG	0000224D (8781.)	01 (1.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
ABS	00010610 (67088.)	02 (2.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE
TEST_009	0000044A (1098.)	03 (3.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
DISPATCH	00000060 (96.)	04 (4.)	NOPIC USR CON REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG
ARGLIST	00000198 (408.)	05 (5.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC LONG
TEST_010	00002142 (8514.)	06 (6.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
TEST_011	00000456 (1110.)	07 (7.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
TEST_012	00002152 (8530.)	08 (8.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
$TSTCNT	00000004 (4.)	09 (9.)	NOPIC USR OVR REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG

Symbol Cross Reference

SYMBOL	VALUE	DEFINITION	REFERENCES...
$$$	=0000018C-R	9762 (94)	3775 (57) 3876 (58) 3978 (59) 4231 (61) 4439 (62) 4592 (63) 4728 (64) 4881 (65) 5014 (66) 5160 (67) 5350 (68) 5629 (69) 5896 (70) 6171 (71) 6396 (72) 6559 (73) 6674 (74) 6864 (77) 6965 (78) 7067 (79) 7320 (81) 7528 (82) 7681 (83) 7817 (84) 7970 (85) 8103 (86) 8249 (87) 8439 (88) 8718 (89) 8985 (90) 9260 (91) 9485 (92) 9648 (93) 9762 (94)
$$ARGS	=0000000A	89 (2)	89 (2)
$$E	=00000004	9762 (94)	3815 (57) 3917 (58) 4019 (59) 4358 (61) 4519 (62) 4648 (63) 4807 (64) 4935 (65) 5092 (66) 5213 (67) 5497 (68) 5771 (69) 6046 (70) 6315 (71) 6487 (72) 6616 (73) 6727 (74) 6904 (77) 7006 (78) 7108 (79) 7447 (81) 7608 (82) 7737 (83) 7896 (84) 8024 (85) 8181 (86) 8302 (87) 8586 (88) 8860 (89) 9135 (90) 9404 (91) 9576 (92) 9704 (93) 9816 (94)
$$M	=00000004	9808 (94)	3668 (56) 3687 (56) 3695 (56) 3708 (56) 3786 (57) 3801 (57) 3810 (57) 3888 (58) 3903 (58) 3912 (58) 3990 (59) 4005 (59) 4014 (59) 4059 (60) 4078 (60) 4086 (60) 4099 (60) 4243 (61) 4254 (61) 4267 (61) 4288 (61) 4304 (61) 4314 (61) 4324 (61) 4341 (61) 4351 (61) 4451 (62) 4466 (62) 4476 (62) 4486 (62) 4504 (62) 4514 (62) 4604 (63) 4619 (63) 4630 (63) 4642 (63) 4740 (64) 4755 (64) 4765 (64) 4775 (64) 4792 (64) 4802 (64) 4893 (65) 4908 (65) 4919 (65) 4931 (65) 5027 (66) 5041 (66) 5051 (66) 5061 (66) 5077 (66) 5087 (66) 5172 (67) 5187 (67) 5197 (67) 5208 (67) 5366 (68) 5381 (68) 5391 (68) 5401 (68) 5419 (68) 5429 (68) 5450 (68) 5465 (68) 5476 (68) 5488 (68) 5645 (69) 5659 (69) 5669 (69) 5679 (69) 5696 (69) 5706 (69) 5726 (69) 5741 (69) 5751 (69) 5762 (69) 5912 (70) 5927 (70) 5937 (70) 5947 (70) 5969 (70) 5979 (70) 5994 (70) 6012 (70) 6023 (70) 6039 (70) 6187 (71) 6201 (71) 6211 (71) 6221 (71) 6241 (71) 6251 (71) 6265 (71) 6283 (71) 6293 (71) 6308 (71) 6410 (72) 6424 (72) 6434 (72) 6456 (72) 6472 (72) 6482 (72) 6574 (73) 6593 (73) 6601 (73) 6611 (73) 6685 (74) 6702 (74) 6719 (74) 6757 (76) 6776 (76) 6784 (76) 6797 (76) 6875 (77) 6890 (77) 6899 (77)

				6977	(78)	6992	(78)	7001	(78)	7079	(79)		
				7094	(79)	7103	(79)	7148	(80)	7167	(80)		
				7175	(80)	7188	(80)	7332	(81)	7343	(81)		
				7356	(81)	7377	(81)	7393	(81)	7403	(81)		
				7413	(81)	7430	(81)	7440	(81)	7540	(82)		
				7555	(82)	7565	(82)	7575	(82)	7593	(82)		
				7603	(82)	7693	(83)	7708	(83)	7719	(83)		
				7731	(83)	7829	(84)	7844	(84)	7854	(84)		
				7864	(84)	7881	(84)	7891	(84)	7982	(85)		
				7997	(85)	8008	(85)	8020	(85)	8116	(86)		
				8130	(86)	8140	(86)	8150	(86)	8166	(86)		
				8176	(86)	8261	(87)	8276	(87)	8286	(87)		
				8297	(87)	8455	(88)	8470	(88)	8480	(88)		
				8490	(88)	8508	(88)	8518	(88)	8539	(88)		
				8554	(88)	8565	(88)	8577	(88)	8734	(89)		
				8748	(89)	8758	(89)	8768	(89)	8785	(89)		
				8795	(89)	8815	(89)	8830	(89)	8840	(89)		
				8851	(89)	9001	(90)	9016	(90)	9026	(90)		
				9036	(90)	9058	(90)	9068	(90)	9083	(90)		
				9101	(90)	9112	(90)	9128	(90)	9276	(91)		
				9290	(91)	9300	(91)	9310	(91)	9330	(91)		
				9340	(91)	9354	(91)	9372	(91)	9382	(91)		
				9397	(91)	9499	(92)	9513	(92)	9523	(92)		
				9545	(92)	9561	(92)	9571	(92)	9662	(93)		
				9681	(93)	9689	(93)	9699	(93)	9773	(94)		
				9790	(94)	9808	(94)						
$$N	=00000000	9808	(94)	#-3173	(53)	#-3178	(53)	#-3183	(53)	#-3200	(53)		
				#-3262	(53)	3263	(53)	3264	(53)	#-3269	(53)		
				3270	(53)	3271	(53)	#-3276	(53)	#-3290	(53)		
				#-3292	(53)	3294	(53)	#-3300	(53)	#-3306	(53)		
				#-3309	(53)	3310	(53)	#-3316	(53)	#-3321	(53)		
				#-3610	(54)	3614	(54)	3616	(54)	3626	(54)		
				3687	(56)	3695	(56)	3708	(56)	3786	(57)		
				3801	(57)	3810	(57)	3888	(58)	3903	(58)		
				3912	(58)	3990	(59)	4005	(59)	4014	(59)		
				4078	(60)	4086	(60)	4099	(60)	4243	(61)		
				4254	(61)	4267	(61)	4288	(61)	4304	(61)		
				4314	(61)	4324	(61)	4341	(61)	4351	(61)		
				4451	(62)	4466	(62)	4476	(62)	4486	(62)		
				4504	(62)	4514	(62)	4604	(63)	4619	(63)		
				4630	(63)	4642	(63)	4740	(64)	4755	(64)		
				4765	(64)	4775	(64)	4792	(64)	4802	(64)		
				4893	(65)	4908	(65)	4919	(65)	4931	(65)		
				5027	(66)	5041	(66)	5051	(66)	5061	(66)		
				5077	(66)	5087	(66)	5172	(67)	5187	(67)		
				5197	(67)	5208	(67)	5366	(68)	5381	(68)		
				5391	(68)	5401	(68)	5419	(68)	5429	(68)		
				5450	(68)	5465	(68)	5476	(68)	5488	(68)		
				5645	(69)	5659	(69)	5669	(69)	5679	(69)		
				5696	(69)	5706	(69)	5726	(69)	5741	(69)		
				5751	(69)	5762	(69)	5912	(70)	5927	(70)		
				5937	(70)	5947	(70)	5969	(70)	5979	(70)		
				5994	(70)	6012	(70)	6023	(70)	6039	(70)		
				6187	(71)	6201	(71)	6211	(71)	6221	(71)		
				6241	(71)	6251	(71)	6265	(71)	6283	(71)		

				6293 (71) 6308 (71) 6410 (72) 6424 (72)
				6434 (72) 6456 (72) 6472 (72) 6482 (72)
				6574 (73) 6593 (73) 6601 (73) 6611 (73)
				6685 (74) 6702 (74) 6719 (74) 6776 (76)
				6784 (76) 6797 (76) 6875 (77) 6890 (77)
				6899 (77) 6977 (78) 6992 (78) 7001 (78)
				7079 (79) 7094 (79) 7103 (79) 7167 (80)
				7175 (80) 7188 (80) 7332 (81) 7343 (81)
				7356 (81) 7377 (81) 7393 (81) 7403 (81)
				7413 (81) 7430 (81) 7440 (81) 7540 (82)
				7555 (82) 7565 (82) 7575 (82) 7593 (82)
				7603 (82) 7693 (83) 7708 (83) 7719 (83)
				7731 (83) 7829 (84) 7844 (84) 7854 (84)
				7864 (84) 7881 (84) 7891 (84) 7982 (85)
				7997 (85) 8008 (85) 8020 (85) 8116 (86)
				8130 (86) 8140 (86) 8150 (86) 8166 (86)
				8176 (86) 8261 (87) 8276 (87) 8286 (87)
				8297 (87) 8455 (88) 8470 (88) 8480 (88)
				8490 (88) 8508 (88) 8518 (88) 8539 (88)
				8554 (88) 8565 (88) 8577 (88) 8734 (89)
				8748 (89) 8758 (89) 8768 (89) 8785 (89)
				8795 (89) 8815 (89) 8830 (89) 8840 (89)
				8851 (89) 9001 (90) 9016 (90) 9026 (90)
				9036 (90) 9058 (90) 9068 (90) 9083 (90)
				9101 (90) 9112 (90) 9128 (90) 9276 (91)
				9290 (91) 9300 (91) 9310 (91) 9330 (91)
				9340 (91) 9354 (91) 9372 (91) 9382 (91)
				9397 (91) 94 (2) 9499 (92) 9513 (92)
				9523 (92) 9545 (92) 9561 (92) 9571 (92)
				9662 (93) 9681 (93) 9689 (93) 9699 (93)
				9773 (94) 9790 (94) 9808 (94)
$$S	=FFFFFFFF	9822	(94)	3649 (56) 3668 (56) 3715 (57) 3775 (57)
				3819 (58) 3876 (58) 3921 (59) 3978 (59)
				4026 (60) 4059 (60) 4106 (61) 4231 (61)
				4362 (62) 4439 (62) 4523 (63) 4592 (63)
				4652 (64) 4728 (64) 4811 (65) 4881 (65)
				4938 (66) 5014 (66) 5096 (67) 5160 (67)
				5217 (68) 5350 (68) 5501 (69) 5629 (69)
				5775 (70) 5896 (70) 6050 (71) 6171 (71)
				6318 (72) 6396 (72) 6490 (73) 6559 (73)
				6619 (74) 6674 (74) 6738 (76) 6757 (76)
				6804 (77) 6864 (77) 6908 (78) 6965 (78)
				7010 (79) 7067 (79) 7115 (80) 7148 (80)
				7195 (81) 7320 (81) 7451 (82) 7528 (82)
				7612 (83) 7681 (83) 7741 (84) 7817 (84)
				7900 (85) 7970 (85) 8027 (86) 8103 (86)
				8185 (87) 8249 (87) 8306 (88) 8439 (88)
				8590 (89) 8718 (89) 8864 (90) 8985 (90)
				9139 (91) 9260 (91) 9407 (92) 9485 (92)
				9579 (93) 9648 (93) 9707 (94) 9762 (94)
$$T1	=0000002C	89	(2)	89 (2)
$ENV	=00000001	72	(2)	
$ER	=FFFFFFFF	9822	(94)	#-3687 (56) #-3695 (56) #-3708 (56) 3775 (57)
				#-3786 (57) #-3801 (57) #-3810 (57) 3876 (58)
				#-3888 (58) #-3903 (58) #-3912 (58) 3978 (59)

#-3990 (59) #-4005 (59) #-4014 (59) #-4078 (60)
#-4086 (60) #-4099 (60) 4231 (61) #-4243 (61)
#-4254 (61) #-4267 (61) #-4288 (61) #-4304 (61)
#-4314 (61) #-4324 (61) #-4341 (61) #-4351 (61)
4439 (62) #-4451 (62) #-4466 (62) #-4476 (62)
#-4486 (62) #-4504 (62) #-4514 (62) 4592 (63)
#-4604 (63) #-4619 (63) #-4630 (63) #-4642 (63)
4728 (64) #-4740 (64) #-4755 (64) #-4765 (64)
#-4775 (64) #-4792 (64) #-4802 (64) 4881 (65)
#-4893 (65) #-4908 (65) #-4919 (65) #-4931 (65)
5014 (66) #-5027 (66) #-5041 (66) #-5051 (66)
#-5061 (66) #-5077 (66) #-5087 (66) 5160 (67)
#-5172 (67) #-5187 (67) #-5197 (67) #-5208 (67)
5350 (68) #-5366 (68) #-5381 (68) #-5391 (68)
#-5401 (68) #-5419 (68) #-5429 (68) #-5450 (68)
#-5465 (68) #-5476 (68) #-5488 (68) 5629 (69)
#-5645 (69) #-5659 (69) #-5669 (69) #-5679 (69)
#-5696 (69) #-5706 (69) #-5726 (69) #-5741 (69)
#-5751 (69) #-5762 (69) 5896 (70) #-5912 (70)
#-5927 (70) #-5937 (70) #-5947 (70) #-5969 (70)
#-5979 (70) #-5994 (70) #-6012 (70) #-6023 (70)
#-6039 (70) 6171 (71) #-6187 (71) #-6201 (71)
#-6211 (71) #-6221 (71) #-6241 (71) #-6251 (71)
#-6265 (71) #-6283 (71) #-6293 (71) #-6308 (71)
6396 (72) #-6410 (72) #-6424 (72) #-6434 (72)
#-6456 (72) #-6472 (72) #-6482 (72) 6559 (73)
#-6574 (73) #-6593 (73) #-6601 (73) #-6611 (73)
6674 (74) #-6685 (74) #-6702 (74) #-6719 (74)
#-6776 (76) #-6784 (76) #-6797 (76) 6864 (77)
#-6875 (77) #-6890 (77) #-6899 (77) 6965 (78)
#-6977 (78) #-6992 (78) #-7001 (78) 7067 (79)
#-7079 (79) #-7094 (79) #-7103 (79) #-7167 (80)
#-7175 (80) #-7188 (80) 7320 (81) #-7332 (81)
#-7343 (81) #-7356 (81) #-7377 (81) #-7393 (81)
#-7403 (81) #-7413 (81) #-7430 (81) #-7440 (81)
7528 (82) #-7540 (82) #-7555 (82) #-7565 (82)
#-7575 (82) #-7593 (82) #-7603 (82) 7681 (83)
#-7693 (83) #-7708 (83) #-7719 (83) #-7731 (83)
7817 (84) #-7829 (84) #-7844 (84) #-7854 (84)
#-7864 (84) #-7881 (84) #-7891 (84) 7970 (85)
#-7982 (85) #-7997 (85) #-8008 (85) #-8020 (85)
8103 (86) #-8116 (86) #-8130 (86) #-8140 (86)
#-8150 (86) #-8166 (86) #-8176 (86) 8249 (87)
#-8261 (87) #-8276 (87) #-8286 (87) #-8297 (87)
8439 (88) #-8455 (88) #-8470 (88) #-8480 (88)
#-8490 (88) #-8508 (88) #-8518 (88) #-8539 (88)
#-8554 (88) #-8565 (88) #-8577 (88) 8718 (89)
#-8734 (89) #-8748 (89) #-8758 (89) #-8768 (89)
#-8785 (89) #-8795 (89) #-8815 (89) #-8830 (89)
#-8840 (89) #-8851 (89) 8985 (90) #-9001 (90)
#-9016 (90) #-9026 (90) #-9036 (90) #-9058 (90)
#-9068 (90) #-9083 (90) #-9101 (90) #-9112 (90)
#-9128 (90) 9260 (91) #-9276 (91) #-9290 (91)
#-9300 (91) #-9310 (91) #-9330 (91) #-9340 (91)
#-9354 (91) #-9372 (91) #-9382 (91) #-9397 (91)

```
                                                      9485  (92)    #-9499  (92)    #-9513  (92)    #-9523  (92)
                                                    #-9545  (92)    #-9561  (92)    #-9571  (92)     9648  (93)
                                                    #-9662  (93)    #-9681  (93)    #-9689  (93)    #-9699  (93)
                                                      9762  (94)    #-9773  (94)    #-9790  (94)    #-9808  (94)
$MO                     =00000001     9823  (94)     9823  (94)
$S$                     =0000018C-R   9762  (94)     3775  (57)     3815  (57)     3876  (58)     3917  (58)
                                                      3978  (59)     4019  (59)     4231  (61)     4358  (61)
                                                      4439  (62)     4519  (62)     4592  (63)     4648  (63)
                                                      4728  (64)     4807  (64)     4881  (65)     4935  (65)
                                                      5014  (66)     5092  (66)     5160  (67)     5213  (67)
                                                      5350  (68)     5497  (68)     5629  (69)     5771  (69)
                                                      5896  (70)     6046  (70)     6171  (71)     6315  (71)
                                                      6396  (72)     6487  (72)     6559  (73)     6616  (73)
                                                      6674  (74)     6727  (74)     6864  (77)     6904  (77)
                                                      6965  (78)     7006  (78)     7067  (79)     7108  (79)
                                                      7320  (81)     7447  (81)     7528  (82)     7608  (82)
                                                      7681  (83)     7737  (83)     7817  (84)     7896  (84)
                                                      7970  (85)     8024  (85)     8103  (86)     8181  (86)
                                                      8249  (87)     8302  (87)     8439  (88)     8586  (88)
                                                      8718  (89)     8860  (89)     8985  (90)     9135  (90)
                                                      9260  (91)     9404  (91)     9485  (92)     9576  (92)
                                                      9648  (93)     9704  (93)     9762  (94)     9816  (94)
$ST                     =00000000     9822  (94)     3668  (56)     3687  (56)     3695  (56)     3708  (56)
                                                      3715  (57)     3775  (57)     3786  (57)     3801  (57)
                                                      3810  (57)     3815  (57)     3819  (58)     3876  (58)
                                                      3888  (58)     3903  (58)     3912  (58)     3917  (58)
                                                      3921  (59)     3978  (59)     3990  (59)     4005  (59)
                                                      4014  (59)     4019  (59)     4022  (59)     4059  (60)
                                                      4078  (60)     4086  (60)     4099  (60)     4106  (61)
                                                      4231  (61)     4243  (61)     4254  (61)     4267  (61)
                                                      4279  (61)     4288  (61)     4304  (61)     4314  (61)
                                                      4324  (61)     4341  (61)     4351  (61)     4358  (61)
                                                      4362  (62)     4439  (62)     4451  (62)     4466  (62)
                                                      4476  (62)     4486  (62)     4504  (62)     4514  (62)
                                                      4519  (62)     4523  (63)     4592  (63)     4604  (63)
                                                      4619  (63)     4630  (63)     4642  (63)     4648  (63)
                                                      4652  (64)     4728  (64)     4740  (64)     4755  (64)
                                                      4765  (64)     4775  (64)     4792  (64)     4802  (64)
                                                      4807  (64)     4811  (65)     4881  (65)     4893  (65)
                                                      4908  (65)     4919  (65)     4931  (65)     4935  (65)
                                                      4938  (66)     5014  (66)     5027  (66)     5041  (66)
                                                      5051  (66)     5061  (66)     5077  (66)     5087  (66)
                                                      5092  (66)     5096  (67)     5160  (67)     5172  (67)
                                                      5187  (67)     5197  (67)     5208  (67)     5213  (67)
                                                      5217  (68)     5350  (68)     5366  (68)     5381  (68)
                                                      5391  (68)     5401  (68)     5419  (68)     5429  (68)
                                                      5450  (68)     5465  (68)     5476  (68)     5488  (68)
                                                      5497  (68)     5501  (69)     5629  (69)     5645  (69)
                                                      5659  (69)     5669  (69)     5679  (69)     5696  (69)
                                                      5706  (69)     5726  (69)     5741  (69)     5751  (69)
                                                      5762  (69)     5771  (69)     5775  (70)     5896  (70)
                                                      5912  (70)     5927  (70)     5937  (70)     5947  (70)
                                                      5969  (70)     5979  (70)     5994  (70)     6012  (70)
                                                      6023  (70)     6039  (70)     6046  (70)     6050  (71)
                                                      6171  (71)     6187  (71)     6201  (71)     6211  (71)
```

```
                                                6221    (71)    6241    (71)    6251    (71)    6265    (71)
                                                6283    (71)    6293    (71)    6308    (71)    6315    (71)
                                                6318    (72)    6396    (72)    6410    (72)    6424    (72)
                                                6434    (72)    6456    (72)    6472    (72)    6482    (72)
                                                6487    (72)    6490    (73)    6559    (73)    6574    (73)
                                                6593    (73)    6601    (73)    6611    (73)    6616    (73)
                                                6619    (74)    6674    (74)    6685    (74)    6702    (74)
                                                6719    (74)    6727    (74)    6733    (74)    6757    (76)
                                                6776    (76)    6784    (76)    6797    (76)    6804    (77)
                                                6864    (77)    6875    (77)    6890    (77)    6899    (77)
                                                6904    (77)    6908    (78)    6965    (78)    6977    (78)
                                                6992    (78)    7001    (78)    7006    (78)    7010    (79)
                                                7067    (79)    7079    (79)    7094    (79)    7103    (79)
                                                7108    (79)    7111    (79)    7148    (80)    7167    (80)
                                                7175    (80)    7188    (80)    7195    (81)    7320    (81)
                                                7332    (81)    7343    (81)    7356    (81)    7368    (81)
                                                7377    (81)    7393    (81)    7403    (81)    7413    (81)
                                                7430    (81)    7440    (81)    7447    (81)    7451    (82)
                                                7528    (82)    7540    (82)    7555    (82)    7565    (82)
                                                7575    (82)    7593    (82)    7603    (82)    7608    (82)
                                                7612    (83)    7681    (83)    7693    (83)    7708    (83)
                                                7719    (83)    7731    (83)    7737    (83)    7741    (84)
                                                7817    (84)    7829    (84)    7844    (84)    7854    (84)
                                                7864    (84)    7881    (84)    7891    (84)    7896    (84)
                                                7900    (85)    7970    (85)    7982    (85)    7997    (85)
                                                8008    (85)    8020    (85)    8024    (85)    8027    (86)
                                                8103    (86)    8116    (86)    8130    (86)    8140    (86)
                                                8150    (86)    8166    (86)    8176    (86)    8181    (86)
                                                8185    (87)    8249    (87)    8261    (87)    8276    (87)
                                                8286    (87)    8297    (87)    8302    (87)    8306    (88)
                                                8439    (88)    8455    (88)    8470    (88)    8480    (88)
                                                8490    (88)    8508    (88)    8518    (88)    8539    (88)
                                                8554    (88)    8565    (88)    8577    (88)    8586    (88)
                                                8590    (89)    8718    (89)    8734    (89)    8748    (89)
                                                8758    (89)    8768    (89)    8785    (89)    8795    (89)
                                                8815    (89)    8830    (89)    8840    (89)    8851    (89)
                                                8860    (89)    8864    (90)    8985    (90)    9001    (90)
                                                9016    (90)    9026    (90)    9036    (90)    9058    (90)
                                                9068    (90)    9083    (90)    9101    (90)    9112    (90)
                                                9128    (90)    9135    (90)    9139    (91)    9260    (91)
                                                9276    (91)    9290    (91)    9300    (91)    9310    (91)
                                                9330    (91)    9340    (91)    9354    (91)    9372    (91)
                                                9382    (91)    9397    (91)    9404    (91)    9407    (92)
                                                9485    (92)    9499    (92)    9513    (92)    9523    (92)
                                                9545    (92)    9561    (92)    9571    (92)    9576    (92)
                                                9579    (93)    9648    (93)    9662    (93)    9681    (93)
                                                9689    (93)    9699    (93)    9704    (93)    9707    (94)
                                                9762    (94)    9773    (94)    9790    (94)    9808    (94)
                                                9816    (94)    9822    (94)
$TN                             =0000000C       9823    (94)    3649    (56)    3668    (56)    3687    (56)    3695    (56)
                                                3708    (56)    3715    (57)    3786    (57)    3801    (57)
                                                3810    (57)    3819    (58)    3888    (58)    3903    (58)
                                                3912    (58)    3921    (59)    3990    (59)    4005    (59)
                                                4014    (59)    4022    (59)    4026    (60)    4059    (60)
                                                4078    (60)    4086    (60)    4099    (60)    4106    (61)
```

4243 (61) 4254 (61) 4267 (61) 4281 (61)
4288 (61) 4304 (61) 4314 (61) 4324 (61)
4341 (61) 4351 (61) 4362 (62) 4451 (62)
4466 (62) 4476 (62) 4486 (62) 4504 (62)
4514 (62) 4523 (63) 4604 (63) 4619 (63)
4630 (63) 4642 (63) 4652 (64) 4740 (64)
4755 (64) 4765 (64) 4775 (64) 4792 (64)
4802 (64) 4811 (65) 4893 (65) 4908 (65)
4919 (65) 4931 (65) 4938 (66) 5027 (66)
5041 (66) 5051 (66) 5061 (66) 5077 (66)
5087 (66) 5096 (67) 5172 (67) 5187 (67)
5197 (67) 5208 (67) 5217 (68) 5366 (68)
5381 (68) 5391 (68) 5401 (68) 5419 (68)
5429 (68) 5450 (68) 5465 (68) 5476 (68)
5488 (68) 5501 (69) 5645 (69) 5659 (69)
5669 (69) 5679 (69) 5696 (69) 5706 (69)
5726 (69) 5741 (69) 5751 (69) 5762 (69)
5775 (70) 5912 (70) 5927 (70) 5937 (70)
5947 (70) 5969 (70) 5979 (70) 5994 (70)
6012 (70) 6023 (70) 6039 (70) 6050 (71)
6187 (71) 6201 (71) 6211 (71) 6221 (71)
6241 (71) 6251 (71) 6265 (71) 6283 (71)
6293 (71) 6308 (71) 6318 (72) 6410 (72)
6424 (72) 6434 (72) 6456 (72) 6472 (72)
6482 (72) 6490 (73) 6574 (73) 6593 (73)
6601 (73) 6611 (73) 6619 (74) 6685 (74)
6702 (74) 6719 (74) 6733 (74) 6738 (76)
6757 (76) 6776 (76) 6784 (76) 6797 (76)
6804 (77) 6875 (77) 6890 (77) 6899 (77)
6908 (78) 6977 (78) 6992 (78) 7001 (78)
7010 (79) 7079 (79) 7094 (79) 7103 (79)
7111 (79) 7115 (80) 7148 (80) 7167 (80)
7175 (80) 7188 (80) 7195 (81) 7332 (81)
7343 (81) 7356 (81) 7370 (81) 7377 (81)
7393 (81) 7403 (81) 7413 (81) 7430 (81`
7440 (81) 7451 (82) 7540 (82) 7555 (82)
7565 (82) 7575 (82) 7593 (82) 7603 (82)
7612 (83) 7693 (83) 7708 (83) 7719 (83)
7731 (83) 7741 (84) 7829 (84) 7844 (84)
7854 (84) 7864 (84) 7881 (84) 7891 (84)
7900 (85) 7982 (85) 7997 (85) 8008 (85)
8020 (85) 8027 (86) 8116 (86) 8130 (86)
8140 (86) 8150 (86) 8166 (86) 8176 (86)
8185 (87) 8261 (87) 8276 (87) 8286 (87)
8297 (87) 8306 (88) 8455 (88) 8470 (88)
8480 (88) 8490 (88) 8508 (88) 8518 (88)
8539 (88) 8554 (88) 8565 (88) 8577 (88)
8590 (89) 8734 (89) 8748 (89) 8758 (89)
8768 (89) 8785 (89) 8795 (89) 8815 (89)
8830 (89) 8840 (89) 8851 (89) 8864 (90)
9001 (90) 9016 (90) 9026 (90) 9036 (90)
9058 (90) 9068 (90) 9083 (90) 9101 (90)
9112 (90) 9128 (90) 9139 (91) 9276 (91)
9290 (91) 9300 (91) 9310 (91) 9330 (91)
9340 (91) 9354 (91) 9372 (91) 9382 (91)

```
                                                      9397    (91)     9407    (92)     9499    (92)     9513    (92)
                                                      9523    (92)     9545    (92)     9561    (92)     9571    (92)
                                                      9579    (93)     9662    (93)     9681    (93)     9689    (93)
                                                      9699    (93)     9707    (94)     9773    (94)     9790    (94)
                                                      9808    (94)     9822    (94)     9823    (94)
ALL                             =00000009     94  (2)  3668    (56)     4059    (60)     6757    (76)     7148    (80)
A_BUFFER_BEGIN                   00000000-XR          3358    (54)     3392    (54)     3675    (56)     3684    (56)
                                                      3778    (57)     3792    (57)     3796    (57)     3880    (58)
                                                      3894    (58)     3898    (58)     3982    (59)     3996    (59)
                                                      4000    (59)     4066    (60)     4075    (60)     4234    (61)
                                                      4249    (61)     4261    (61)     4273    (61)     4294    (61)
                                                      4299    (61)     4330    (61)     4335    (61)     4442    (62)
                                                      4458    (62)     4462    (62)    #-4491   (62)     4495    (62)
                                                      4499    (62)     4595    (63)     4610    (63)     4613    (63)
                                                      4731    (64)     4747    (64)     4751    (64)    #-4779   (64)
                                                      4783    (64)     4787    (64)     4884    (65)     4899    (65)
                                                      4902    (65)     5018    (66)     5033    (66)     5037    (66)
                                                      5068    (66)     5072    (66)     5163    (67)     5178    (67)
                                                      5181    (67)     5357    (68)     5373    (68)     5377    (68)
                                                     #-5406   (68)     5410    (68)     5414    (68)     5441    (68)
                                                      5456    (68)     5459    (68)     5636    (69)     5651    (69)
                                                      5655    (69)    #-5684   (69)     5687    (69)     5691    (69)
                                                      5717    (69)     5732    (69)     5735    (69)     5903    (70)
                                                      5919    (70)     5923    (70)    #-5952   (70)     5960    (70)
                                                      5964    (70)     5985    (70)     6000    (70)     6006    (70)
                                                      6178    (71)     6193    (71)     6197    (71)    #-6226   (71)
                                                      6232    (71)     6236    (71)     6256    (71)     6271    (71)
                                                      6277    (71)     6401    (72)     6416    (72)     6420    (72)
                                                      6463    (72)     6467    (72)     6563    (73)     6568    (73)
                                                      6586    (73)     6764    (76)     6773    (76)     6867    (77)
                                                      6881    (77)     6885    (77)     6969    (78)     6983    (78)
                                                      6987    (78)     7071    (79)     7085    (79)     7089    (79)
                                                      7155    (80)     7164    (80)     7323    (81)     7338    (81)
                                                      7350    (81)     7362    (81)     7383    (81)     7388    (81)
                                                      7419    (81)     7424    (81)     7531    (82)     7547    (82)
                                                      7551    (82)    #-7580   (82)     7584    (82)     7588    (82)
                                                      7684    (83)     7699    (83)     7702    (83)     7820    (84)
                                                      7836    (84)     7840    (84)    #-7868   (84)     7872    (84)
                                                      7876    (84)     7973    (85)     7988    (85)     7991    (85)
                                                      8107    (86)     8122    (86)     8126    (86)     8157    (86)
                                                      8161    (86)     8252    (87)     8267    (87)     8270    (87)
                                                      8446    (88)     8462    (88)     8466    (88)    #-8495   (88)
                                                      8499    (88)     8503    (88)     8530    (88)     8545    (88)
                                                      8548    (88)     8725    (89)     8740    (89)     8744    (89)
                                                     #-8773   (89)     8776    (89)     8780    (89)     8806    (89)
                                                      8821    (89)     8824    (89)     8992    (90)     9008    (90)
                                                      9012    (90)    #-9041   (90)     9049    (90)     9053    (90)
                                                      9074    (90)     9089    (90)     9095    (90)     9267    (91)
                                                      9282    (91)     9286    (91)    #-9315   (91)     9321    (91)
                                                      9325    (91)     9345    (91)     9360    (91)     9366    (91)
                                                      9490    (92)     9505    (92)     9509    (92)     9552    (92)
                                                      9556    (92)     9652    (93)     9656    (93)     9674    (93)
                                                      9795    (94)
BASE_009                        00000000-R    3649  (56)  3668    (56)
BASE_010                        00000000-R    4026  (60)  4059    (60)
```

```
BASE_011                         00000000-R   6738   (76)     6757   (76)
BASE_012                         00000000-R   7115   (80)     7148   (80)
BIT...                          =00000005     92     (2)      72     (2)      90     (2)      92     (2)
BLOCK_00                        =00000000    287     (4)     1206   (21)     1207   (21)     1226   (21)     1243   (22)
                                                             1260   (22)     1261   (22)     1277   (22)     1278   (22)
                                                             1294   (22)     1295   (22)     1312   (23)     1329   (23)
                                                             1346   (23)     1362   (24)     1379   (24)     1396   (24)
                                                             1412   (25)     1429   (25)     1446   (25)     1463   (26)
                                                             1480   (26)     1497   (26)     1514   (27)     1531   (27)
                                                             1565   (28)     1582   (28)     1615   (29)     1616   (29)
                                                             1632   (29)     1633   (29)     1683   (30)     1700   (30)
                                                             1752   (31)     1769   (32)     1819   (33)     1836   (33)
                                                             2086   (38)     2087   (38)     2106   (38)     2123   (39)
                                                              380    (5)      381    (5)      397    (5)      398    (5)
                                                              414    (5)      415    (5)      432    (6)      449    (6)
                                                              466    (6)      482    (7)      499    (7)      516    (7)
                                                              532    (8)      549    (8)      566    (8)      583    (9)
                                                              600    (9)      617    (9)      634   (10)      651   (10)
                                                              685   (11)      702   (11)      735   (12)      736   (12)
                                                              752   (12)      753   (12)      803   (13)      820   (13)
                                                              872   (14)      889   (15)      939   (16)      956   (16)
BLOCK_01                        =00000001    288     (4)     1650   (29)     1667   (30)     1684   (30)     1701   (30)
                                                             1717   (31)     1718   (31)     1734   (31)     1735   (31)
                                                             1786   (32)     1803   (32)      770   (12)      787   (13)
                                                              804   (13)      821   (13)      837   (14)      838   (14)
                                                              854   (14)      855   (14)      906   (15)      923   (15)
BLOCK_02                        =00000002    289     (4)     1107   (19)     1124   (19)     1174   (20)     1190   (21)
                                                             1548   (27)     1599   (28)     1853   (33)     1869   (34)
                                                             1987   (36)     2004   (36)     2054   (37)     2070   (38)
                                                              668   (10)      719   (11)      973   (16)      989   (17)
BLOCK_04                        =00000004    290     (4)     1005   (17)     1022   (17)     1852   (33)     1868   (34)
                                                             1885   (34)     1902   (34)      972   (16)      988   (17)
BLOCK_05                        =00000005    291     (4)     1072   (18)     1089   (19)     1952   (35)     1969   (36)
BLOCK_06                        =00000006    292     (4)     1006   (17)     1023   (17)     1038   (18)     1039   (18)
                                                             1055   (18)     1056   (18)     1073   (18)     1090   (19)
                                                             1140   (20)     1157   (20)     1173   (20)     1189   (21)
                                                             1311   (23)     1328   (23)     1886   (34)     1903   (34)
                                                             1918   (35)     1919   (35)     1935   (35)     1936   (35)
                                                             1953   (35)     1970   (36)     2020   (37)     2037   (37)
                                                             2053   (37)     2069   (38)      431    (6)      448    (6)
BLOCK_0A                        =0000000A    293     (4)     1345   (23)     1361   (24)      465    (6)      481    (7)
BLOCK_0C                        =0000000C    294     (4)     1411   (25)     1428   (25)      531    (8)      548    (8)
BLOCK_0D                        =0000000D    295     (4)     1530   (27)     1547   (27)     1564   (28)     1581   (28)
                                                             1598   (28)      650   (10)      667   (10)      684   (11)
                                                              701   (11)      718   (11)
BLOCK_0E                        =0000000E    296     (4)     1378   (24)     1395   (24)      498    (7)      515    (7)
BLOCK_0F                        =0000000F    297     (4)     1445   (25)     1479   (26)     1496   (26)      565    (8)
                                                              599    (9)      616    (9)
BLOCK_15                        =00000015    298     (4)     1225   (21)     1242   (22)     1751   (31)     1768   (32)
                                                             1785   (32)     1802   (32)     2105   (38)     2122   (39)
                                                              871   (14)      888   (15)      905   (15)      922   (15)
BLOCK_5A                        =0000005A    299     (4)     1106   (19)     1123   (19)     1139   (20)     1156   (20)
                                                             1986   (36)     2003   (36)     2019   (37)     2036   (37)
BLOCK_80                        =00000080    300     (4)     1649   (29)     1666   (30)     1818   (33)     1835   (33)
                                                              769   (12)      786   (13)      938   (16)      955   (16)
```

```
BLOCK_8F                =0000008F     301    (4)     1462   (26)     1513   (27)     582    (9)      633    (10)
BUFFER_SIZE             =00000600     192    (2)   #-5358   (68)   #-5442   (68)   #-5637   (69)   #-5718   (69)
                                                   #-5904   (70)   #-5986   (70)   #-6179   (71)   #-6257   (71)
                                                   #-8447   (88)   #-8531   (88)   #-8726   (89)   #-8807   (89)
                                                   #-8993   (90)   #-9075   (90)   #-9268   (91)   #-9346   (91)
BUF_LIM                  00000013-R   165    (2)   #-3450   (54)   #-3477   (54)   #-3676   (56)   #-4067   (60)
                                                   #-6765   (76)   #-7156   (80)
BYTE_COUNT_00           =00000000     305    (4)     1004   (17)     1021   (17)     1037   (18)     1054   (18)
                                                     1071   (18)     1088   (19)     1105   (19)     1122   (19)
                                                     1138   (20)     1155   (20)     1172   (20)     1188   (21)
                                                     1204   (21)     1223   (21)     1240   (22)     1241   (22)
                                                     1258   (22)     1259   (22)     1275   (22)     1276   (22)
                                                     1292   (22)     1293   (22)     1310   (23)     1327   (23)
                                                     1343   (23)     1359   (24)     1377   (24)     1394   (24)
                                                     1409   (25)     1426   (25)     1443   (25)     1460   (26)
                                                     1478   (26)     1494   (26)     1511   (27)     1529   (27)
                                                     1546   (27)     1563   (28)     1580   (28)     1597   (28)
                                                     1613   (29)     1630   (29)     1647   (29)     1664   (30)
                                                     1681   (30)     1698   (30)     1732   (31)     1749   (31)
                                                     1766   (32)     1783   (32)     1800   (32)     1833   (33)
                                                     1850   (33)     1866   (34)     1884   (34)     1901   (34)
                                                     1917   (35)     1934   (35)     1951   (35)     1968   (36)
                                                     1985   (36)     2002   (36)     2018   (37)     2035   (37)
                                                     2052   (37)     2068   (38)     2084   (38)     2103   (38)
                                                     2120   (39)     2121   (39)     2144   (40)     2145   (40)
                                                     2162   (40)     2179   (40)     2195   (41)     2213   (41)
                                                     2230   (41)     2246   (42)     2279   (42)     2297   (43)
                                                     2314   (43)     2315   (43)     2332   (43)     2349   (43)
                                                     2365   (44)     2383   (44)     2400   (44)     2416   (45)
                                                     2449   (45)     2467   (46)     378    (5)      379    (5)
                                                     395    (5)      396    (5)      412    (5)      413    (5)
                                                     430    (6)      447    (6)      463    (6)      479    (7)
                                                     497    (7)      514    (7)      529    (8)      546    (8)
                                                     563    (8)      580    (9)      598    (9)      614    (9)
                                                     631    (10)     649    (10)     666    (10)     683    (11)
                                                     700    (11)     717    (11)     733    (12)     750    (12)
                                                     767    (12)     784    (13)     801    (13)     818    (13)
                                                     852    (14)     869    (14)     886    (15)     903    (15)
                                                     920    (15)     953    (16)     970    (16)     986    (17)
BYTE_COUNT_01           =00000001     306    (4)     1477   (26)     1562   (28)     1716   (31)     1817   (33)
                                                     1851   (33)     1867   (34)     2229   (41)     2264   (42)
                                                     2280   (42)     2399   (44)     2434   (45)     2450   (45)
                                                     2514   (47)     597    (9)      682    (11)     836    (14)
                                                     937    (16)     971    (16)     987    (17)
BYTE_COUNT_02           =00000002     307    (4)     1205   (21)     1224   (21)     1344   (23)     1360   (24)
                                                     1410   (25)     1427   (25)     1444   (25)     1461   (26)
                                                     1495   (26)     1512   (27)     1648   (29)     1665   (30)
                                                     1682   (30)     1699   (30)     1733   (31)     1750   (31)
                                                     1767   (32)     1784   (32)     1801   (32)     1834   (33)
                                                     2085   (38)     2104   (38)     2196   (41)     2366   (44)
                                                     464    (6)      480    (7)      530    (8)      547    (8)
                                                     564    (8)      581    (9)      615    (9)      632    (10)
                                                     768    (12)     785    (13)     802    (13)     819    (13)
                                                     853    (14)     870    (14)     887    (15)     904    (15)
                                                     921    (15)     954    (16)
```

```
BYTE_COUNT_04                   =00000004      308     (4)       1614    (29)      1631    (29)      2247    (42)      2417    (45)
                                                                734     (12)      751     (12)
BYTE_COUNT_0A                   =0000000A      309     (4)       1013    (17)      1029    (18)      1046    (18)      1063    (18)
                                                                1080    (19)      1097    (19)      1114    (19)      1130    (20)
                                                                1147    (20)      1164    (20)      1180    (21)      1197    (21)
                                                                1216    (21)      1233    (22)      1251    (22)      1268    (22)
                                                                1285    (22)      1302    (23)      1319    (23)      1336    (23)
                                                                1352    (24)      1369    (24)      1386    (24)      1402    (25)
                                                                1419    (25)      1436    (25)      1453    (26)      1470    (26)
                                                                1487    (26)      1504    (27)      1521    (27)      1538    (27)
                                                                1555    (28)      1572    (28)      1589    (28)      1606    (29)
                                                                1623    (29)      1640    (29)      1657    (30)      1674    (30)
                                                                1691    (30)      1708    (31)      1725    (31)      1742    (31)
                                                                1759    (32)      1776    (32)      1793    (32)      1809    (33)
                                                                1826    (33)      1843    (33)      1859    (34)      1876    (34)
                                                                1893    (34)      1909    (35)      1926    (35)      1943    (35)
                                                                1960    (36)      1977    (36)      1994    (36)      2010    (37)
                                                                2027    (37)      2044    (37)      2060    (38)      2077    (38)
                                                                2096    (38)      2113    (39)      2137    (40)      2154    (40)
                                                                2171    (40)      2188    (41)      2205    (41)      2222    (41)
                                                                2239    (42)      2256    (42)      2272    (42)      2289    (43)
                                                                2307    (43)      2324    (43)      2341    (43)      2358    (44)
                                                                2375    (44)      2392    (44)      2409    (45)      2426    (45)
                                                                2442    (45)      2459    (46)      371     (5)       388     (5)
                                                                405     (5)       422     (6)       439     (6)       456     (6)
                                                                472     (7)       489     (7)       506     (7)       522     (8)
                                                                539     (8)       556     (8)       573     (9)       590     (9)
                                                                607     (9)       624     (10)      641     (10)      658     (10)
                                                                675     (11)      692     (11)      709     (11)      726     (12)
                                                                743     (12)      760     (12)      777     (13)      794     (13)
                                                                811     (13)      828     (14)      845     (14)      862     (14)
                                                                879     (15)      896     (15)      913     (15)      929     (16)
                                                                946     (16)      963     (16)      979     (17)      996     (17)
BYTE_COUNT_12                   =00000012      311     (4)       1326    (23)      446     (6)
BYTE_COUNT_1A                   =0000001A      310     (4)       2178    (40)      2348    (43)      2478    (47)
BYTE_COUNT_64                   =00000064      312     (4)       1070    (18)      1171    (20)      1950    (35)      2051    (37)
                                                                2296    (43)      2466    (46)      2653    (50)      2685    (51)
BYTE_COUNT_74                   =00000074      313     (4)       2570    (48)      2611    (49)
BYTE_COUNT_80                   =00000080      314     (4)       1003    (17)      1020    (17)      1036    (18)      1053    (18)
                                                                1087    (19)      1104    (19)      1121    (19)      1137    (20)
                                                                1154    (20)      1187    (21)      1309    (23)      1376    (24)
                                                                1393    (24)      1528    (27)      1545    (27)      1579    (28)
                                                                1596    (28)      1883    (34)      1900    (34)      1916    (35)
                                                                1933    (35)      1967    (36)      1984    (36)      2001    (36)
                                                                2017    (37)      2034    (37)      2067    (38)      2161    (40)
                                                                2212    (41)      2331    (43)      2382    (44)      2498    (47)
                                                                2506    (47)      2522    (47)      2530    (48)      2538    (48)
                                                                2546    (48)      2554    (48)      2562    (48)      2578    (49)
                                                                2587    (49)      2595    (49)      2603    (49)      2620    (49)
                                                                2629    (50)      2637    (50)      2645    (50)      2661    (50)
                                                                2669    (50)      2677    (51)      2693    (51)      429     (6)
                                                                496     (7)       513     (7)       648     (10)      665     (10)
                                                                699     (11)      716     (11)
BYTE_COUNT_F4                   =000000F4      315     (4)       1715    (31)      1816    (33)      2263    (42)      2433    (45)
                                                                835     (14)      936     (16)
```

```
B_CONTINUE                      00000023-R  361   (5)     3472 (54)  3547 (54)  3577 (54)  3683 (56)
                                                         4074 (60)  4298 (61)  4461 (62)  4750 (64)
                                                         5036 (66)  5376 (68)  5654 (69)  5922 (70)
                                                         6196 (71)  6419 (72)  6772 (76)  7163 (80)
                                                         7387 (81)  7550 (82)  7839 (84)  8125 (86)
                                                         8465 (88)  8743 (89)  9011 (90)  9285 (91)
                                                         9508 (92)
B_COUNT                         00000003-R  158   (2)   #-4456 (62)  #-4492 (62)  #-4745 (64)  #-4780 (64)
                                                        #-5371 (68)  #-5407 (68)  #-5471 (68)  #-5482 (68)
                                                        #-5492 (68)  #-5917 (70)  #-5953 (70)  #-5955 (70)
                                                        #-7545 (82)  #-7581 (82)  #-7834 (84)  #-7869 (84)
                                                        #-8460 (88)  #-8496 (88)  #-8560 (88)  #-8571 (88)
                                                        #-8581 (88)  #-9006 (90)  #-9042 (90)  #-9044 (90)
B_COUNT1                        00000004-R  159   (2)   #-5351 (68)  #-5434 (68)  #-5438 (68)  #-5631 (69)
                                                        #-5711 (69)  #-5714 (69)  #-5766 (69)  #-5899 (70)
                                                        #-6043 (70)  #-6174 (71)  #-6312 (71)  #-8440 (88)
                                                        #-8523 (88)  #-8527 (88)  #-8720 (89)  #-8800 (89)
                                                        #-8803 (89)  #-8855 (89)  #-8988 (90)  #-9132 (90)
                                                        #-9263 (91)  #-9401 (91)
B_COUNT2                        00000005-R  160   (2)   #-5352 (68)  #-5407 (68)  #-5433 (68)  #-5435 (68)
                                                        #-8441 (88)  #-8496 (88)  #-8522 (88)  #-8524 (88)
B_DATA_PKT_1                    000006EC-R  2476  (47)    4271 (61)    4320 (61)    7360 (81)    7409 (81)
B_DATA_PKT_10                   00000AAB-R  2560  (48)
B_DATA_PKT_11                   00000B2F-R  2568  (48)
B_DATA_PKT_12                   00000BA7-R  2576  (49)
B_DATA_PKT_13                   00000C2B-R  2585  (49)    2814 (52)  2815 (52)  2816 (52)  2817 (52)
                                                         2821 (52)  2822 (52)  2823 (52)  2824 (52)
                                                         2894 (52)  2895 (52)  2896 (52)  2897 (52)
                                                         3025 (52)  3026 (52)  3027 (52)  3028 (52)
                                                         3032 (52)  3033 (52)  3034 (52)  3035 (52)
                                                         3105 (52)  3106 (52)  3107 (52)  3108 (52)
B_DATA_PKT_14                   00000CAF-R  2593  (49)    2828 (52)  2829 (52)  2830 (52)  2831 (52)
                                                         2835 (52)  2836 (52)  2837 (52)  2838 (52)
                                                         3039 (52)  3040 (52)  3041 (52)  3042 (52)
                                                         3046 (52)  3047 (52)  3048 (52)  3049 (52)
B_DATA_PKT_15                   00000D33-R  2601  (49)
B_DATA_PKT_16                   00000DB7-R  2609  (49)
B_DATA_PKT_17                   00000E3B-R  2618  (49)
B_DATA_PKT_18                   00000EBF-R  2627  (50)    2844 (52)  2845 (52)  2849 (52)  2850 (52)
                                                         3055 (52)  3056 (52)  3060 (52)  3061 (52)
B_DATA_PKT_19                   00000F43-R  2635  (50)    2854 (52)  2858 (52)  3065 (52)  3069 (52)
B_DATA_PKT_2                    0000070A-R  2496  (47)    4482 (62)  4614 (63)  4771 (64)  4903 (65)
                                                         5057 (66)  5182 (67)  6442 (72)  6587 (73)
                                                         7571 (82)  7703 (83)  7860 (84)  7992 (85)
                                                         8146 (86)  8271 (87)  9531 (92)  9675 (93)
B_DATA_PKT_20                   00000FC7-R  2643  (50)    2862 (52)  2866 (52)  3073 (52)  3077 (52)
B_DATA_PKT_21                   0000104B-R  2651  (50)
B_DATA_PKT_22                   000010B3-R  2659  (50)
B_DATA_PKT_23                   00001137-R  2667  (50)    2870 (52)  2874 (52)  3081 (52)  3085 (52)
B_DATA_PKT_24                   000011BB-R  2675  (51)    2878 (52)  2882 (52)  3089 (52)  3093 (52)
B_DATA_PKT_25                   0000123F-R  2683  (51)
B_DATA_PKT_26                   000012A7-R  2691  (51)
B_DATA_PKT_3                    0000078E-R  2504  (47)    2708 (52)  2709 (52)  2710 (52)  2711 (52)
                                                         2715 (52)  2716 (52)  2717 (52)  2718 (52)
                                                         2733 (52)  2734 (52)  2735 (52)  2736 (52)
```

				2742 (52) 2746 (52) 2758 (52) 2919 (52)
				2920 (52) 2921 (52) 2922 (52) 2926 (52)
				2927 (52) 2928 (52) 2929 (52) 2944 (52)
				2945 (52) 2946 (52) 2947 (52) 2953 (52)
				2957 (52) 2969 (52)
B_DATA_PKT_4	00000812-R	2512	(47)	2722 (52) 2750 (52) 2933 (52) 2961 (52)
B_DATA_PKT_5	00000817-R	2520	(47)	2726 (52) 2754 (52) 2937 (52) 2965 (52)
B_DATA_PKT_6	0000089B-R	2528	(48)	2727 (52) 2728 (52) 2729 (52) 2764 (52)
				2765 (52) 2766 (52) 2767 (52) 2775 (52)
				2776 (52) 2777 (52) 2778 (52) 2887 (52)
				2888 (52) 2889 (52) 2890 (52) 2904 (52)
				2905 (52) 2906 (52) 2907 (52) 2938 (52)
				2939 (52) 2940 (52) 2975 (52) 2976 (52)
				2977 (52) 2978 (52) 2986 (52) 2987 (52)
				2988 (52) 2989 (52) 3098 (52) 3099 (52)
				3100 (52) 3101 (52) 3115 (52) 3116 (52)
				3117 (52) 3118 (52)
B_DATA_PKT_7	0000091F-R	2536	(48)	2768 (52) 2769 (52) 2770 (52) 2771 (52)
				2779 (52) 2780 (52) 2781 (52) 2782 (52)
				2979 (52) 2980 (52) 2981 (52) 2982 (52)
				2990 (52) 2991 (52) 2992 (52) 2993 (52)
B_DATA_PKT_8	000009A3-R	2544	(48)	2786 (52) 2787 (52) 2788 (52) 2789 (52)
				2793 (52) 2794 (52) 2795 (52) 2796 (52)
				2997 (52) 2998 (52) 2999 (52) 3000 (52)
				3004 (52) 3005 (52) 3006 (52) 3007 (52)
B_DATA_PKT_9	00000A27-R	2552	(48)	2800 (52) 2801 (52) 2802 (52) 2803 (52)
				2807 (52) 2808 (52) 2809 (52) 2810 (52)
				3011 (52) 3012 (52) 3013 (52) 3014 (52)
				3018 (52) 3019 (52) 3020 (52) 3021 (52)
B_DIAGNOSE_CMD	00000040-R	403	(5)	3884 (58)
B_END_PACKET_1	000005D4-R	2135	(40)	2901 (52) 3795 (57) 3897 (58) 3999 (59)
B_END_PACKET_10	00000652-R	2287	(43)	
B_END_PACKET_2	000005E2-R	2152	(40)	4260 (61)
B_END_PACKET_3	000005F0-R	2169	(40)	4334 (61)
B_END_PACKET_4	000005FE-R	2186	(41)	2712 (52) 2719 (52) 2730 (52) 2737 (52)
				2790 (52) 2797 (52) 2804 (52) 2811 (52)
				2818 (52) 2825 (52) 2832 (52) 2839 (52)
				2891 (52) 2898 (52) 2908 (52) 4498 (62)
				4637 (63) 4786 (64) 4926 (65)
B_END_PACKET_5	0000060C-R	2203	(41)	2743 (52) 2747 (52) 2755 (52) 2759 (52)
				2855 (52) 2859 (52) 2863 (52) 2867 (52)
				2871 (52) 2875 (52) 2879 (52) 2883 (52)
				5071 (66) 5203 (67) 6466 (72) 6605 (73)
B_END_PACKET_6	0000061A-R	2220	(41)	2723 (52) 2751 (52)
B_END_PACKET_7	00000628-R	2237	(42)	2772 (52) 2783 (52)
B_END_PACKET_8	00000636-R	2254	(42)	
B_END_PACKET_9	00000644-R	2270	(42)	2846 (52) 2851 (52)
B_FLAGS	00000000-R	155	(2)	3291 (53) 3295 (53) #-3343 (54) 3349 (54)
				#-3351 (54) 3356 (54) #-3363 (54) #-3366 (54)
				#-3377 (54) 3383 (54) #-3385 (54) 3390 (54)
				#-3397 (54) #-3400 (54) #-3414 (54) 3421 (54)
				#-3439 (54) 3445 (54) #-3458 (54) 3464 (54)
				#-3522 (54) #-3679 (56) 3685 (56) 3692 (56)
				#-3777 (57) 3785 (57) #-3799 (57) #-3879 (58)
				3887 (58) #-3901 (58) #-3981 (59) 3989 (59)

```
                                                  #-4003   (59)   #-4071   (60)     4076   (60)     4083   (60)
                                                  #-4233   (61)     4242   (61)     4287   (61)     4323   (61)
                                                  #-4339   (61)   #-4441   (62)     4450   (62)     4485   (62)
                                                  #-4502   (62)   #-4594   (63)     4603   (63)   #-4617   (63)
                                                  #-4730   (64)     4739   (64)     4774   (64)   #-4790   (64)
                                                  #-4883   (65)     4892   (65)   #-4906   (65)   #-5015   (66)
                                                    5026   (66)     5060   (66)   #-5075   (66)   #-5162   (67)
                                                    5171   (67)   #-5185   (67)   #-5356   (68)     5365   (68)
                                                    5400   (68)   #-5417   (68)   #-5440   (68)     5449   (68)
                                                  #-5463   (68)   #-5635   (69)     5644   (69)     5678   (69)
                                                  #-5694   (69)   #-5716   (69)     5725   (69)   #-5739   (69)
                                                  #-5902   (70)     5911   (70)     5946   (70)   #-5967   (70)
                                                  #-5984   (70)     5993   (70)   #-6010   (70)   #-6177   (71)
                                                    6186   (71)     6220   (71)   #-6239   (71)   #-6255   (71)
                                                    6264   (71)   #-6281   (71)   #-6398   (72)     6409   (72)
                                                  #-6439   (72)     6452   (72)   #-6470   (72)   #-6561   (73)
                                                    6573   (73)   #-6578   (73)     6584   (73)   #-6590   (73)
                                                  #-6677   (74)     6684   (74)   #-6690   (74)     6699   (74)
                                                    6717   (74)   #-6768   (76)     6774   (76)     6781   (76)
                                                  #-6866   (77)     6874   (77)   #-6888   (77)   #-6968   (78)
                                                    6976   (78)   #-6990   (78)   #-7070   (79)     7078   (79)
                                                  #-7092   (79)   #-7160   (80)     7165   (80)     7172   (80)
                                                  #-7322   (81)     7331   (81)     7376   (81)     7412   (81)
                                                  #-7428   (81)   #-7530   (82)     7539   (82)     7574   (82)
                                                  #-7591   (82)   #-7683   (83)     7692   (83)   #-7706   (83)
                                                  #-7819   (84)     7828   (84)     7863   (84)   #-7879   (84)
                                                  #-7972   (85)     7981   (85)   #-7995   (85)   #-8104   (86)
                                                    8115   (86)     8149   (86)   #-8164   (86)   #-8251   (87)
                                                    8260   (87)   #-8274   (87)   #-8445   (88)     8454   (88)
                                                    8489   (88)   #-8506   (88)   #-8529   (88)     8538   (88)
                                                  #-8552   (88)   #-8724   (89)     8733   (89)     8767   (89)
                                                  #-8783   (89)   #-8805   (89)     8814   (89)   #-8828   (89)
                                                  #-8991   (90)     9000   (90)     9035   (90)   #-9056   (90)
                                                  #-9073   (90)     9082   (90)   #-9099   (90)   #-9266   (91)
                                                    9275   (91)     9309   (91)   #-9328   (91)   #-9344   (91)
                                                    9353   (91)   #-9370   (91)   #-9487   (92)     9498   (92)
                                                  #-9528   (92)     9541   (92)   #-9559   (92)   #-9650   (93)
                                                    9661   (93)   #-9666   (93)     9672   (93)   #-9678   (93)
                                                  #-9765   (94)     9772   (94)   #-9778   (94)     9787   (94)
                                                    9806   (94)
B_FLAGS2                  00000001-R   156    (2)  #-3680   (56)     3686   (56)     3693   (56)     3704   (56)
                                                  #-3705   (56)   #-4072   (60)     4077   (60)     4084   (60)
                                                    4095   (60)   #-4096   (60)   #-5897   (70)   #-5898   (70)
                                                    5954   (70)   #-5956   (70)     6002   (70)     6030   (70)
                                                  #-6032   (70)   #-6172   (71)   #-6173   (71)     6227   (71)
                                                  #-6228   (71)     6273   (71)     6298   (71)   #-6299   (71)
                                                  #-6440   (72)   #-6562   (73)   #-6678   (74)   #-6769   (76)
                                                    6775   (76)     6782   (76)     6793   (76)   #-6794   (76)
                                                  #-7161   (80)     7166   (80)     7173   (80)     7184   (80)
                                                  #-7185   (80)   #-8986   (90)   #-8987   (90)     9043   (90)
                                                  #-9045   (90)     9091   (90)     9119   (90)   #-9121   (90)
                                                  #-9261   (91)   #-9262   (91)     9316   (91)   #-9317   (91)
                                                    9362   (91)     9387   (91)   #-9388   (91)   #-9529   (92)
                                                  #-9651   (93)   #-9766   (94)
B_FLAGS3                  00000002-R   157    (2)  #-3562   (54)   #-3572   (54)   #-3596   (54)   #-5016   (66)
```

```
                                                #-5066   (66)   #-6399   (72)   #-6441   (72)    6451   (72)
                                                #-6461   (72)   #-6679   (74)    6700    (74)  #-6708   (74)
                                                 6716    (74)   #-8105   (86)  #-8155    (86)  #-9488   (92)
                                                #-9530   (92)    9540    (92)  #-9550    (92)  #-9767   (94)
                                                 9788    (94)   #-9797   (94)   9805     (94)

B_INIT_CMD                      00000024-R  369   (5)    3782   (57)
B_INIT_DRIVE                    0000001F-R  354   (5)    3354   (54)    3388   (54)
B_NOP_CMD                       00000032-R  386   (5)    3986   (59)    6681   (74)
B_POS_1_CMD                     000002EE-R  1231  (22)   2900   (52)
B_READ_10_CMD                   00000174-R  775   (13)   2792   (52)
B_READ_11_CMD                   00000190-R  809   (13)   2806   (52)
B_READ_12_CMD                   000001AC-R  843   (14)
B_READ_13_CMD                   000001C8-R  877   (15)   2820   (52)
B_READ_14_CMD                   000001E4-R  911   (15)   2834   (52)
B_READ_15_CMD                   00000200-R  944   (16)
B_READ_16_CMD                   0000021C-R  977   (17)   2848   (52)
B_READ_17_CMD                   00000238-R  1011  (17)   2857   (52)
B_READ_18_CMD                   00000254-R  1044  (18)   2865   (52)
B_READ_19_CMD                   00000270-R  1078  (19)
B_READ_1_CMD                    0000004E-R  420   (6)    4239   (61)
B_READ_20_CMD                   0000028C-R  1112  (19)   2873   (52)
B_READ_21_CMD                   000002A8-R  1145  (20)   2881   (52)
B_READ_22_CMD                   000002C4-R  1178  (21)
B_READ_23_CMD                   000002D2-R  1195  (21)   2886   (52)    2903   (52)
B_READ_24_CMD                   000002E0-R  1214  (21)   2893   (52)
B_READ_2_CMD                    00000078-R  470   (7)    4600   (63)
B_READ_3_CMD                    00000094-R  504   (7)    5168   (67)    6570   (73)
B_READ_4_CMD                    000000B0-R  537   (8)    4889   (65)
B_READ_5_CMD                    000000E8-R  605   (9)    2725   (52)
B_READ_6_CMD                    000000F6-R  622   (10)   2732   (52)
B_READ_7_CMD                    0000012E-R  690   (11)   2753   (52)
B_READ_8_CMD                    0000013C-R  707   (11)   2757   (52)
B_READ_9_CMD                    00000158-R  741   (12)   2774   (52)
B_RESPONSE                      00000012-R  164   (2)    4280   (61)    7369   (81)
B_WRITE_10_CMD                  00000120-R  673   (11)   2749   (52)
B_WRITE_11_CMD                  0000014A-R  724   (12)   2763   (52)
B_WRITE_12_CMD                  00000166-R  758   (12)   2785   (52)
B_WRITE_13_CMD                  00000182-R  792   (13)   2799   (52)
B_WRITE_14_CMD                  0000019E-R  826   (14)
B_WRITE_15_CMD                  000001BA-R  860   (14)   2813   (52)
B_WRITE_16_CMD                  000001D6-R  894   (15)   2827   (52)
B_WRITE_17_CMD                  000001F2-R  927   (16)
B_WRITE_18_CMD                  0000020E-R  961   (16)   2843   (52)
B_WRITE_19_CMD                  0000022A-R  994   (17)   2853   (52)
B_WRITE_1_CMD                   0000005C-R  437   (6)    4284   (61)
B_WRITE_20_CMD                  00000246-R  1027  (18)   2861   (52)
B_WRITE_21_CMD                  00000262-R  1061  (18)
B_WRITE_22_CMD                  0000027E-R  1095  (19)   2869   (52)
B_WRITE_23_CMD                  0000029A-R  1128  (20)   2877   (52)
B_WRITE_24_CMD                  000002B6-R  1162  (20)
B_WRITE_2_CMD                   0000006A-R  454   (6)    4447   (62)
B_WRITE_3_CMD                   00000086-R  487   (7)    5023   (66)    6406   (72)
B_WRITE_4_CMD                   000000A2-R  520   (8)    4736   (64)
B_WRITE_5_CMD                   000000BE-R  554   (8)    2707   (52)
B_WRITE_6_CMD                   000000CC-R  571   (9)    2714   (52)
```

```
B_WRITE_7_CMD                 000000DA-R   588    (9)     2721   (52)
B_WRITE_8_CMD                 00000104-R   639    (10)    2741   (52)
B_WRITE_9_CMD                 00000112-R   656    (10)    2745   (52)
B_ZEROS                       00000021-R   358    (5)     3346   (54)     3380   (54)
CEP_FUNCTIONAL               =00000000     72     (2)
CEP_REPAIR                   =00000001     72     (2)     72     (2)
CHECKSUM_01                  =00000001     216    (3)     2508   (47)     2517   (47)     2532   (48)     2548   (48)
                                                          2556   (48)     2605   (49)     2614   (49)     2623   (49)
                                                          2632   (50)     2640   (50)     2648   (50)
CHECKSUM_02                  =00000002     208    (3)     1279   (22)     2631   (50)     399    (5)
CHECKSUM_03                  =00000003     209    (3)     1262   (22)     2639   (50)     382    (5)
CHECKSUM_04                  =00000004     210    (3)     1208   (21)     1634   (29)     1702   (30)     2088   (38)
                                                          754    (12)     822    (13)
CHECKSUM_05                  =00000005     211    (3)     1617   (29)     1685   (30)     1736   (31)     737    (12)
                                                          805    (13)     856    (14)
CHECKSUM_08                  =00000008     212    (3)     1870   (34)     990    (17)
CHECKSUM_09                  =00000009     213    (3)     1296   (22)     1854   (33)     416    (5)      974    (16)
CHECKSUM_0A                  =0000000A     214    (3)     1245   (22)     2149   (40)     2166   (40)     2183   (40)
                                                          2217   (41)     2234   (41)     2301   (43)     383    (5)
                                                          400    (5)      417    (5)      434    (6)      451    (6)
                                                          602    (9)
CHECKSUM_0B                  =0000000B     215    (3)     2284   (42)
CHECKSUM_0C                  =0000000C     217    (3)     1209   (21)     1228   (21)     2200   (41)     2268   (42)
                                                          468    (6)      484    (7)      568    (8)      585    (9)
                                                          619    (9)      636    (10)     840    (14)     874    (14)
                                                          891    (15)     941    (16)     958    (16)
CHECKSUM_0D                  =0000000D     218    (3)     534    (8)      551    (8)      772    (12)     789    (13)
                                                          806    (13)     823    (13)     857    (14)     908    (15)
                                                          925    (15)
CHECKSUM_0E                  =0000000E     219    (3)     1363   (24)     2251   (42)     483    (7)      738    (12)
                                                          755    (12)
CHECKSUM_0F                  =0000000F     220    (3)     1347   (23)     467    (6)
CHECKSUM_10                  =00000010     221    (3)     1430   (25)     550    (8)
CHECKSUM_11                  =00000011     222    (3)     1413   (25)     2664   (50)     533    (8)
CHECKSUM_12                  =00000012     223    (3)     1263   (22)     1280   (22)     1297   (22)     1314   (23)
                                                          1331   (23)     1482   (26)     2125   (39)     2319   (43)
                                                          2336   (43)     2353   (43)     2387   (44)     2404   (44)
                                                          2471   (46)
CHECKSUM_13                  =00000013     224    (3)     1498   (26)     1566   (28)     2454   (45)     618    (9)
                                                          686    (11)
CHECKSUM_14                  =00000014     225    (3)     1348   (23)     1364   (24)     1447   (25)     1448   (25)
                                                          1465   (26)     1499   (26)     1516   (27)     1720   (31)
                                                          1754   (31)     1771   (32)     1821   (33)     1838   (33)
                                                          2089   (38)     2108   (38)     2370   (44)     2438   (45)
                                                          567    (8)
CHECKSUM_15                  =00000015     226    (3)     1414   (25)     1431   (25)     1481   (26)     1652   (29)
                                                          1669   (30)     1686   (30)     1703   (30)     1737   (31)
                                                          1788   (32)     1805   (32)     601    (9)
CHECKSUM_16                  =00000016     227    (3)     1618   (29)     1635   (29)     2421   (45)     2672   (50)
                                                          2680   (51)
CHECKSUM_19                  =00000019     228    (3)     1227   (21)     1770   (32)     1804   (32)     2107   (38)
                                                          890    (15)     924    (15)
CHECKSUM_1A                  =0000001A     229    (3)     1753   (31)     1787   (32)     873    (14)     907    (15)
CHECKSUM_1C                  =0000001C     230    (3)     1244   (22)     2124   (39)
CHECKSUM_1D                  =0000001D     231    (3)     1330   (23)     450    (6)
```

```
CHECKSUM_2D                     =0000002D       232     (3)     2687    (51)    2696    (51)
CHECKSUM_36                     =00000036       233     (3)     2267    (42)    2437    (45)
CHECKSUM_41                     =00000041       234     (3)     2540    (48)    2564    (48)    2589    (49)    2597    (49)
CHECKSUM_42                     =00000042       235     (3)     2148    (40)    2199    (41)    2250    (42)    2283    (42)
                                                                2318    (43)    2369    (44)    2420    (45)    2453    (45)
CHECKSUM_43                     =00000043       236     (3)     2233    (41)    2403    (44)
CHECKSUM_54                     =00000054       237     (3)
CHECKSUM_5C                     =0000005C       238     (3)     2182    (40)    2352    (43)
CHECKSUM_6E                     =0000006E       239     (3)     1074    (18)    1954    (35)
CHECKSUM_6F                     =0000006F       240     (3)     1175    (20)    2055    (37)
CHECKSUM_72                     =00000072       241     (3)     2656    (50)
CHECKSUM_75                     =00000075       242     (3)     2572    (48)    2581    (49)
CHECKSUM_79                     =00000079       243     (3)     1820    (33)    940     (16)
CHECKSUM_80                     =00000080       244     (3)     2509    (47)    2526    (47)    2533    (48)    2541    (48)
CHECKSUM_82                     =00000082       245     (3)     2671    (50)
CHECKSUM_83                     =00000083       246     (3)     2647    (50)    2679    (51)
CHECKSUM_84                     =00000084       247     (3)     1668    (30)    1837    (33)    788     (13)    957     (16)
CHECKSUM_85                     =00000085       248     (3)     1651    (29)    2590    (49)    771     (12)
CHECKSUM_88                     =00000088       249     (3)     1024    (17)    1904    (34)
CHECKSUM_89                     =00000089       250     (3)     1007    (17)    1091    (19)    1887    (34)    1971    (36)
CHECKSUM_8A                     =0000008A       251     (3)     1057    (18)    1191    (21)    1313    (23)    1937    (35)
                                                                2071    (38)    433     (6)     501     (7)     518     (7)
                                                                653     (10)    687     (11)    704     (11)
CHECKSUM_8B                     =0000008B       252     (3)     1040    (18)    1920    (35)
CHECKSUM_8C                     =0000008C       253     (3)     1109    (19)    1126    (19)    1176    (20)    1192    (21)
                                                                670     (10)    721     (11)
CHECKSUM_8D                     =0000008D       255     (4)     975     (16)    991     (17)
CHECKSUM_90                     =00000090       256     (4)     1008    (17)    1025    (17)    1041    (18)    1058    (18)
                                                                1075    (18)    1092    (19)    1142    (20)    1159    (20)
CHECKSUM_91                     =00000091       257     (4)     1583    (28)    1600    (28)    703     (11)    720     (11)
CHECKSUM_92                     =00000092       258     (4)     1381    (24)    1397    (24)    1398    (24)    1532    (27)
                                                                1533    (27)    1549    (27)    1567    (28)    1584    (28)
                                                                517     (7)     652     (10)    669     (10)
CHECKSUM_93                     =00000093       259     (4)     1380    (24)    1515    (27)    500     (7)     635     (10)
CHECKSUM_94                     =00000094       260     (4)     1464    (26)    1550    (27)    1601    (28)    1989    (36)
                                                                2006    (36)    2056    (37)    2072    (38)    584     (9)
CHECKSUM_95                     =00000095       261     (4)     1855    (33)    1871    (34)
CHECKSUM_98                     =00000098       262     (4)     1888    (34)    1905    (34)    1921    (35)    1938    (35)
                                                                1955    (35)    1972    (36)    2022    (37)    2039    (37)
CHECKSUM_A6                     =000000A6       263     (4)     2300    (43)    2470    (46)
CHECKSUM_A9                     =000000A9       264     (4)
CHECKSUM_AA                     =000000AA       265     (4)
CHECKSUM_AB                     =000000AB       266     (4)     2516    (47)    2525    (47)
CHECKSUM_AE                     =000000AE       267     (4)     2606    (49)    2615    (49)
CHECKSUM_BA                     =000000BA       268     (4)     2493    (47)    2624    (49)
CHECKSUM_BF                     =000000BF       269     (4)     2492    (47)    2501    (47)
CHECKSUM_C0                     =000000C0       270     (4)     2557    (48)    2565    (48)
CHECKSUM_C1                     =000000C1       271     (4)     2500    (47)
CHECKSUM_C2                     =000000C2       272     (4)     2165    (40)    2216    (41)    2335    (43)    2386    (44)
CHECKSUM_C5                     =000000C5       273     (4)     2598    (49)
CHECKSUM_C9                     =000000C9       274     (4)     2688    (51)
CHECKSUM_DE                     =000000DE       275     (4)     1125    (19)    1158    (20)    2005    (36)    2038    (37)
CHECKSUM_DF                     =000000DF       276     (4)     1108    (19)    1141    (20)    1988    (36)    2021    (37)
CHECKSUM_E0                     =000000E0       277     (4)     2549    (48)
CHECKSUM_E5                     =000000E5       278     (4)     2697    (51)
```

```
CHECKSUM_E8                     =000000E8     279    (4)      2573   (48)
CHECKSUM_F4                     =000000F4     280    (4)      2582   (49)
CHECKSUM_F7                     =000000F7     281    (4)      2663   (50)
CHECKSUM_FA                     =000000FA     282    (4)      1719   (31)     839    (14)
CHECKSUM_FC                     =000000FC     283    (4)      2655   (50)
CHECK_PACKET                     0000213B-R   3504   (54)     3702   (56)    3808   (57)    3910   (58)    4012   (59)
                                                             4093   (60)    4265   (61)    4277   (61)    4312   (61)
                                                             4349   (61)    4474   (62)    4512   (62)    4628   (63)
                                                             4640   (63)    4763   (64)    4800   (64)    4917   (65)
                                                             4929   (65)    5049   (66)    5085   (66)    5195   (67)
                                                             5206   (67)    5389   (68)    5427   (68)    5474   (68)
                                                             5486   (68)    5667   (69)    5704   (69)    5749   (69)
                                                             5760   (69)    5935   (70)    5977   (70)    6021   (70)
                                                             6037   (70)    6209   (71)    6249   (71)    6291   (71)
                                                             6306   (71)    6432   (72)    6480   (72)    6599   (73)
                                                             6609   (73)    6791   (76)    6897   (77)    6999   (78)
                                                             7101   (79)    7182   (80)    7354   (81)    7366   (81)
                                                             7401   (81)    7438   (81)    7563   (82)    7601   (82)
                                                             7717   (83)    7729   (83)    7852   (84)    7889   (84)
                                                             8006   (85)    8018   (85)    8138   (86)    8174   (86)
                                                             8284   (87)    8295   (87)    8478   (88)    8516   (88)
                                                             8563   (88)    8575   (88)    8756   (89)    8793   (89)
                                                             8838   (89)    8849   (89)    9024   (90)    9066   (90)
                                                             9110   (90)    9126   (90)    9298   (91)    9338   (91)
                                                             9380   (91)    9395   (91)    9521   (92)    9569   (92)
                                                             9687   (93)    9697   (93)
CLEAR_BUFFER                     00002134-R   3487   (54)   #-3490   (54)    3678   (56)    3780   (57)    3882   (58)
                                                             3984   (59)    4069   (60)    4236   (61)    4444   (62)
                                                             4597   (63)    4733   (64)    4886   (65)    5020   (66)
                                                             5165   (67)    5359   (68)    5443   (68)    5638   (69)
                                                             5719   (69)    5905   (70)    5987   (70)    6180   (71)
                                                             6258   (71)    6403   (72)    6565   (73)    6767   (76)
                                                             6869   (77)    6971   (78)    7073   (79)    7158   (80)
                                                             7325   (81)    7533   (82)    7686   (83)    7822   (84)
                                                             7975   (85)    8109   (86)    8254   (87)    8448   (88)
                                                             8532   (88)    8727   (89)    8808   (89)    8994   (90)
                                                             9076   (90)    9269   (91)    9347   (91)    9492   (92)
                                                             9654   (93)
COMMAND_FLAG                    =00000002     103    (2)      1012   (17)    1028   (18)    1045   (18)    1062   (18)
                                                             1079   (19)    1096   (19)    1113   (19)    1129   (20)
                                                             1146   (20)    1163   (20)    1179   (21)    1196   (21)
                                                             1215   (21)    1232   (22)    1250   (22)    1267   (22)
                                                             1284   (22)    1301   (23)    1318   (23)    1335   (23)
                                                             1351   (24)    1368   (24)    1385   (24)    1401   (25)
                                                             1418   (25)    1435   (25)    1452   (26)    1469   (26)
                                                             1486   (26)    1503   (27)    1520   (27)    1537   (27)
                                                             1554   (28)    1571   (28)    1588   (28)    1605   (29)
                                                             1622   (29)    1639   (29)    1656   (30)    1673   (30)
                                                             1690   (30)    1707   (31)    1724   (31)    1741   (31)
                                                             1758   (32)    1775   (32)    1792   (32)    1808   (33)
                                                             1825   (33)    1842   (33)    1858   (34)    1875   (34)
                                                             1892   (34)    1908   (35)    1925   (35)    1942   (35)
                                                             1959   (36)    1976   (36)    1993   (36)    2009   (37)
                                                             2026   (37)    2043   (37)    2059   (38)    2076   (38)
                                                             2095   (38)    2112   (39)     370   (5)      387   (5)
```

```
                                                        404    (5)     421    (6)     438    (6)     455    (6)
                                                        471    (7)     488    (7)     505    (7)     521    (8)
                                                        538    (8)     555    (8)     572    (9)     589    (9)
                                                        606    (9)     623    (10)    640    (10)    657    (10)
                                                        674    (11)    691    (11)    708    (11)    725    (12)
                                                        742    (12)    759    (12)    776    (13)    793    (13)
                                                        810    (13)    827    (14)    844    (14)    861    (14)
                                                        878    (15)    895    (15)    912    (15)    928    (16)
                                                        945    (16)    962    (16)    978    (17)    995    (17)
COMMAND_TBL_1                 0000132B-R   2707   (52)   5354   (68)
COMMAND_TBL_2                 00001397-R   2741   (52)   5633   (69)
COMMAND_TBL_3                 000013D3-R   2763   (52)   5900   (70)
COMMAND_TBL_4                 000014E3-R   2843   (52)   6175   (71)
COMMAND_TBL_5                 00001563-R   2886   (52)
CONTINUE_FLAG                =00000010     106    (2)    362    (5)
DATA_0000                    =00000000     319    (4)    2480   (47)    2482   (47)    2488   (47)    2489   (47)
                                                        2490   (47)    2524   (47)    2531   (48)    2580   (49)
                                                        2613   (49)    2622   (49)    2695   (51)    359    (5)
DATA_0001                    =00000001     320    (4)    2481   (47)    2539   (48)
DATA_0004                    =00000004     321    (4)    2479   (47)
DATA_000F                    =0000000F     322    (4)    2483   (47)
DATA_0015                    =00000015     323    (4)    2588   (49)
DATA_0080                    =00000080     324    (4)    2604   (49)    2612   (49)    2621   (49)
DATA_009                      00000014-R   3668   (56)   3668   (56)
DATA_00AA                    =000000AA     325    (4)    2515   (47)    2523   (47)
DATA_00FF                    =000000FF     326    (4)    2499   (47)
DATA_010                      0000001C-R   4059   (60)   4059   (60)
DATA_0100                    =00000100     327    (4)    2555   (48)
DATA_0101                    =00000101     328    (4)    2563   (48)    2571   (48)    2579   (49)
DATA_011                      00000020-R   6757   (76)   6757   (76)
DATA_0115                    =00000115     329    (4)    2596   (49)
DATA_012                      00000028-R   7148   (80)   7148   (80)
DATA_0180                    =00000180     330    (4)    2547   (48)
DATA_0204                    =00000204     331    (4)    2630   (50)
DATA_0206                    =00000206     332    (4)    2686   (51)    2694   (51)
DATA_025A                    =0000025A     333    (4)    2670   (50)
DATA_0400                    =00000400     335    (4)    2484   (47)
DATA_0604                    =00000604     336    (4)    2638   (50)
DATA_0605                    =00000605     337    (4)    2654   (50)    2662   (50)
DATA_0606                    =00000606     338    (4)    2646   (50)
DATA_065A                    =0000065A     334    (4)    2678   (51)
DATA_0800                    =00000800     339    (4)    2491   (47)
DATA_0960                    =00000960     340    (4)    2486   (47)
DATA_1400                    =00001400     341    (4)    2487   (47)
DATA_1D14                    =00001D14     342    (4)
DATA_4A77                    =00004A77     343    (4)
DATA_774A                    =0000774A     345    (4)    2485   (47)
DATA_7D09                    =00007D09     344    (4)
DATA_ERR_CONT                 00001E4D-R   3260   (53)   3708   (56)    4099   (60)    4476   (62)    4765   (64)
                                                        5051   (66)    5391   (68)    5669   (69)    5937   (70)
                                                        6211   (71)    6434   (72)    6797   (76)    7188   (80)
                                                        7565   (82)    7854   (84)    8140   (86)    8480   (88)
                                                        8758   (89)    9026   (90)    9300   (91)    9523   (92)
DATA_ERR_DATA                 00001E75-R   3267   (53)   4314   (61)    4630   (63)    4919   (65)    5197   (67)
                                                        5476   (68)    5751   (69)    6023   (70)    6293   (71)
```

```
                                                  6601   (73)    7403   (81)    7719   (83)    8008   (85)
                                                  8286   (87)    8565   (88)    8840   (89)    9112   (90)
                                                  9382   (91)    9689   (93)
DATA_ERR_END                 00001E9D-R   3274   (53)  3810   (57)    3912   (58)    4014   (59)    4267   (61)
                                                  4351   (61)    4514   (62)    4642   (63)    4802   (64)
                                                  4931   (65)    5087   (66)    5208   (67)    5429   (68)
                                                  5488   (68)    5706   (69)    5762   (69)    5979   (70)
                                                  6039   (70)    6251   (71)    6308   (71)    6482   (72)
                                                  6611   (73)    6899   (77)    7001   (78)    7103   (79)
                                                  7356   (81)    7440   (81)    7603   (82)    7731   (83)
                                                  7891   (84)    8020   (85)    8176   (86)    8297   (87)
                                                  8518   (88)    8577   (88)    8795   (89)    8851   (89)
                                                  9068   (90)    9128   (90)    9340   (91)    9397   (91)
                                                  9571   (92)    9699   (93)
DATA_FFFF                    =0000FFFF     346    (4)   2507   (47)
DATA_FLAG                    =00000001     102    (2)   2477   (47)    2497   (47)    2505   (47)    2513   (47)
                                                  2521   (47)    2529   (48)    2537   (48)    2545   (48)
                                                  2553   (48)    2561   (48)    2569   (48)    2577   (49)
                                                  2586   (49)    2594   (49)    2602   (49)    2610   (49)
                                                  2619   (49)    2628   (50)    2636   (50)    2644   (50)
                                                  2652   (50)    2660   (50)    2668   (50)    2676   (51)
                                                  2684   (51)    2692   (51)
DEFAULT                      =00000000     94     (2)   3668   (56)    4059   (60)    6757   (76)    7148   (80)
DELAY_TIME1                  =FFFB6C20     196    (2)  #-3357  (54)  #-3391  (54)  #-3425  (54)  #-3470  (54)
                                                  #-3781  (57)  #-3791  (57)  #-3883  (58)  #-3985  (59)
                                                  #-3995  (59)  #-4319  (61)  #-4481  (62)  #-4770  (64)
                                                  #-5056  (66)  #-5396  (68)  #-5445  (68)  #-5674  (69)
                                                  #-5721  (69)  #-5942  (70)  #-5989  (70)  #-6216  (71)
                                                  #-6260  (71)  #-6680  (74)  #-6870  (77)  #-6880  (77)
                                                  #-6972  (78)  #-7074  (79)  #-7084  (79)  #-7408  (81)
                                                  #-7570  (82)  #-7859  (84)  #-8145  (86)  #-8485  (88)
                                                  #-8534  (88)  #-8763  (89)  #-8810  (89)  #-9031  (90)
                                                  #-9078  (90)  #-9305  (91)  #-9349  (91)  #-9768  (94)
DELAY_TIME2                  =FFF85EE0     197    (2)  #-3344  (54)  #-3352  (54)  #-3378  (54)  #-3386  (54)
DELAY_TIME3                  =FFF3CB00     198    (2)  #-3893  (58)  #-4293  (61)  #-4446  (62)  #-4494  (62)
                                                  #-4599  (63)  #-4609  (63)  #-4735  (64)  #-4746  (64)
                                                  #-4888  (65)  #-4898  (65)  #-5032  (66)  #-5167  (67)
                                                  #-5177  (67)  #-5361  (68)  #-5640  (69)  #-5650  (69)
                                                  #-5731  (69)  #-5907  (70)  #-5999  (70)  #-6182  (71)
                                                  #-6270  (71)  #-6415  (72)  #-6693  (74)  #-6982  (78)
                                                  #-7382  (81)  #-7535  (82)  #-7583  (82)  #-7688  (83)
                                                  #-7698  (83)  #-7824  (84)  #-7835  (84)  #-7977  (85)
                                                  #-7987  (85)  #-8121  (86)  #-8256  (87)  #-8266  (87)
                                                  #-8450  (88)  #-8729  (89)  #-8739  (89)  #-8820  (89)
                                                  #-8996  (90)  #-9088  (90)  #-9271  (91)  #-9359  (91)
                                                  #-9504  (92)  #-9781  (94)
DELAY_TIME4                  =FFF0BDC0     199    (2)  #-3449  (54)  #-3476  (54)
DELAY_TIME5                  =FFE17B80     200    (2)  #-4782  (64)  #-5022  (66)  #-5409  (68)  #-5455  (68)
                                                  #-5959  (70)  #-6405  (72)  #-7871  (84)  #-8111  (86)
                                                  #-8498  (88)  #-8544  (88)  #-9048  (90)  #-9494  (92)
DELAY_TIME6                  =FFC2F700     201    (2)  #-4457  (62)  #-5067  (66)  #-5372  (68)  #-5686  (69)
                                                  #-7546  (82)  #-8156  (86)  #-8461  (88)  #-8775  (89)
DELAY_TIME7                  =FF7E4CE0     202    (2)  #-4238  (61)  #-4283  (61)  #-4329  (61)  #-5918  (70)
                                                  #-6192  (71)  #-6231  (71)  #-6444  (72)  #-6462  (72)
                                                  #-6579  (73)  #-6709  (74)  #-7327  (81)  #-7372  (81)
```

```
                                                  #-7418   (81)   #-9007   (90)   #-9281   (91)   #-9320   (91)
                                                  #-9533   (92)   #-9551   (92)   #-9667   (93)   #-9798   (94)
DELAY_TIME8                 =FAEF00C0     203    (2)  #-4248   (61)   #-7337   (81)
DIAGNOSE                    =00000007     117    (2)    1286   (22)     406    (5)
DS$ABORT                     00010020                  3690   (56)    3698   (56)    3711   (56)    3789   (57)
                                                       3804   (57)    3812   (57)    3891   (58)    3906   (58)
                                                       3914   (58)    3993   (59)    4008   (59)    4016   (59)
                                                       4081   (60)    4089   (60)    4102   (60)    4246   (61)
                                                       4258   (61)    4269   (61)    4291   (61)    4308   (61)
                                                       4317   (61)    4327   (61)    4345   (61)    4353   (61)
                                                       4454   (62)    4470   (62)    4479   (62)    4489   (62)
                                                       4508   (62)    4517   (62)    4607   (63)    4623   (63)
                                                       4633   (63)    4645   (63)    4743   (64)    4759   (64)
                                                       4768   (64)    4778   (64)    4796   (64)    4805   (64)
                                                       4896   (65)    4912   (65)    4922   (65)    4934   (65)
                                                       5030   (66)    5045   (66)    5054   (66)    5064   (66)
                                                       5081   (66)    5090   (66)    5175   (67)    5191   (67)
                                                       5200   (67)    5211   (67)    5369   (68)    5385   (68)
                                                       5394   (68)    5404   (68)    5423   (68)    5432   (68)
                                                       5453   (68)    5469   (68)    5479   (68)    5491   (68)
                                                       5648   (69)    5663   (69)    5672   (69)    5682   (69)
                                                       5700   (69)    5709   (69)    5729   (69)    5745   (69)
                                                       5754   (69)    5765   (69)    5915   (70)    5931   (70)
                                                       5940   (70)    5950   (70)    5973   (70)    5982   (70)
                                                       5997   (70)    6016   (70)    6026   (70)    6042   (70)
                                                       6190   (71)    6205   (71)    6214   (71)    6224   (71)
                                                       6245   (71)    6253   (71)    6268   (71)    6287   (71)
                                                       6296   (71)    6311   (71)    6413   (72)    6428   (72)
                                                       6437   (72)    6459   (72)    6476   (72)    6485   (72)
                                                       6577   (73)    6596   (73)    6604   (73)    6614   (73)
                                                       6688   (74)    6705   (74)    6722   (74)    6779   (76)
                                                       6787   (76)    6800   (76)    6878   (77)    6893   (77)
                                                       6901   (77)    6980   (78)    6995   (78)    7003   (78)
                                                       7082   (79)    7097   (79)    7105   (79)    7170   (80)
                                                       7178   (80)    7191   (80)    7335   (81)    7347   (81)
                                                       7358   (81)    7380   (81)    7397   (81)    7406   (81)
                                                       7416   (81)    7434   (81)    7442   (81)    7543   (82)
                                                       7559   (82)    7568   (82)    7578   (82)    7597   (82)
                                                       7606   (82)    7696   (83)    7712   (83)    7722   (83)
                                                       7734   (83)    7832   (84)    7848   (84)    7857   (84)
                                                       7867   (84)    7885   (84)    7894   (84)    7985   (85)
                                                       8001   (85)    8011   (85)    8023   (85)    8119   (86)
                                                       8134   (86)    8143   (86)    8153   (86)    8170   (86)
                                                       8179   (86)    8264   (87)    8280   (87)    8289   (87)
                                                       8300   (87)    8458   (88)    8474   (88)    8483   (88)
                                                       8493   (88)    8512   (88)    8521   (88)    8542   (88)
                                                       8558   (88)    8568   (88)    8580   (88)    8737   (89)
                                                       8752   (89)    8761   (89)    8771   (89)    8789   (89)
                                                       8798   (89)    8818   (89)    8834   (89)    8843   (89)
                                                       8854   (89)    9004   (90)    9020   (90)    9029   (90)
                                                       9039   (90)    9062   (90)    9071   (90)    9086   (90)
                                                       9105   (90)    9115   (90)    9131   (90)    9279   (91)
                                                       9294   (91)    9303   (91)    9313   (91)    9334   (91)
                                                       9342   (91)    9357   (91)    9376   (91)    9385   (91)
                                                       9400   (91)    9502   (92)    9517   (92)    9526   (92)
```

```
                                9548  (92)     9565  (92)     9574  (92)     9665  (93)
                                9684  (93)     9692  (93)     9702  (93)     9776  (94)
                                9793  (94)     9811  (94)
DS$ASKLGCL                      00010098
                                4280  (61)     7369  (81)
DS$BGNSUB                       00010030
                                3775  (57)     3876  (58)     3978  (59)     4231  (61)
                                4439  (62)     4592  (63)     4728  (64)     4881  (65)
                                5014  (66)     5160  (67)     5350  (68)     5629  (69)
                                5896  (70)     6171  (71)     6396  (72)     6559  (73)
                                6674  (74)     6864  (77)     6965  (78)     7067  (79)
                                7320  (81)     7528  (82)     7681  (83)     7817  (84)
                                7970  (85)     8103  (86)     8249  (87)     8439  (88)
                                8718  (89)     8985  (90)     9260  (91)     9485  (92)
                                9648  (93)     9762  (94)
DS$BREAK                        00010058
                                3701  (56)     3807  (57)     3909  (58)     4011  (59)
                                4022  (59)     4092  (60)     4264  (61)     4276  (61)
                                4311  (61)     4348  (61)     4473  (62)     4511  (62)
                                4627  (63)     4639  (63)     4762  (64)     4799  (64)
                                4916  (65)     4928  (65)     5048  (66)     5084  (66)
                                5194  (67)     5205  (67)     5388  (68)     5426  (68)
                                5473  (68)     5485  (68)     5666  (69)     5703  (69)
                                5748  (69)     5759  (69)     5934  (70)     5976  (70)
                                6020  (70)     6036  (70)     6208  (71)     6248  (71)
                                6290  (71)     6305  (71)     6431  (72)     6450  (72)
                                6479  (72)     6583  (73)     6598  (73)     6608  (73)
                                6698  (74)     6715  (74)     6733  (74)     6790  (76)
                                6896  (77)     6998  (78)     7100  (79)     7111  (79)
                                7181  (80)     7353  (81)     7365  (81)     7400  (81)
                                7437  (81)     7562  (82)     7600  (82)     7716  (83)
                                7728  (83)     7851  (84)     7888  (84)     8005  (85)
                                8017  (85)     8137  (86)     8173  (86)     8283  (87)
                                8294  (87)     8477  (88)     8515  (88)     8562  (88)
                                8574  (88)     8755  (89)     8792  (89)     8837  (89)
                                8848  (89)     9023  (90)     9065  (90)     9109  (90)
                                9125  (90)     9297  (91)     9337  (91)     9379  (91)
                                9394  (91)     9520  (92)     9539  (92)     9568  (92)
                                9671  (93)     9686  (93)     9696  (93)     9786  (94)
                                9804  (94)     9822  (94)
DS$CLRVEC                       00010168
                                4020  (59)     6675  (74)     6729  (74)     6730  (74)
                                6731  (74)     7109  (79)     9763  (94)     9818  (94)
                                9819  (94)     9820  (94)
DS$ENDSUB                       00010038
                                3815  (57)     3917  (58)     4019  (59)     4358  (61)
                                4519  (62)     4648  (63)     4807  (64)     4935  (65)
                                5092  (66)     5213  (67)     5497  (68)     5771  (69)
                                6046  (70)     6315  (71)     6487  (72)     6616  (73)
                                6727  (74)     6904  (77)     7006  (78)     7108  (79)
                                7447  (81)     7608  (82)     7737  (83)     7896  (84)
                                8024  (85)     8181  (86)     8302  (87)     8586  (88)
                                8860  (89)     9135  (90)     9404  (91)     9576  (92)
                                9704  (93)     9816  (94)
DS$ERRHARD                      000100D0
                                3687  (56)     3695  (56)     3708  (56)     3786  (57)
                                3801  (57)     3810  (57)     3888  (58)     3903  (58)
                                3912  (58)     3990  (59)     4005  (59)     4014  (59)
                                4078  (60)     4086  (60)     4099  (60)     4243  (61)
                                4254  (61)     4267  (61)     4288  (61)     4304  (61)
                                4314  (61)     4324  (61)     4341  (61)     4351  (61)
```

```
                                                4451  (62)    4466  (62)    4476  (62)    4486  (62)
                                                4504  (62)    4514  (62)    4604  (63)    4619  (63)
                                                4630  (63)    4642  (63)    4740  (64)    4755  (64)
                                                4765  (64)    4775  (64)    4792  (64)    4802  (64)
                                                4893  (65)    4908  (65)    4919  (65)    4931  (65)
                                                5027  (66)    5041  (66)    5051  (66)    5061  (66)
                                                5077  (66)    5087  (66)    5172  (67)    5187  (67)
                                                5197  (67)    5208  (67)    5366  (68)    5381  (68)
                                                5391  (68)    5401  (68)    5419  (68)    5429  (68)
                                                5450  (68)    5465  (68)    5476  (68)    5488  (68)
                                                5645  (69)    5659  (69)    5669  (69)    5679  (69)
                                                5696  (69)    5706  (69)    5726  (69)    5741  (69)
                                                5751  (69)    5762  (69)    5912  (70)    5927  (70)
                                                5937  (70)    5947  (70)    5969  (70)    5979  (70)
                                                5994  (70)    6012  (70)    6023  (70)    6039  (70)
                                                6187  (71)    6201  (71)    6211  (71)    6221  (71)
                                                6241  (71)    6251  (71)    6265  (71)    6283  (71)
                                                6293  (71)    6308  (71)    6410  (72)    6424  (72)
                                                6434  (72)    6456  (72)    6472  (72)    6482  (72)
                                                6574  (73)    6593  (73)    6601  (73)    6611  (73)
                                                6685  (74)    6702  (74)    6719  (74)    6776  (76)
                                                6784  (76)    6797  (76)    6875  (77)    6890  (77)
                                                6899  (77)    6977  (78)    6992  (78)    7001  (78)
                                                7079  (79)    7094  (79)    7103  (79)    7167  (80)
                                                7175  (80)    7188  (80)    7332  (81)    7343  (81)
                                                7356  (81)    7377  (81)    7393  (81)    7403  (81)
                                                7413  (81)    7430  (81)    7440  (81)    7540  (82)
                                                7555  (82)    7565  (82)    7575  (82)    7593  (82)
                                                7603  (82)    7693  (83)    7708  (83)    7719  (83)
                                                7731  (83)    7829  (84)    7844  (84)    7854  (84)
                                                7864  (84)    7881  (84)    7891  (84)    7982  (85)
                                                7997  (85)    8008  (85)    8020  (85)    8116  (86)
                                                8130  (86)    8140  (86)    8150  (86)    8166  (86)
                                                8176  (86)    8261  (87)    8276  (87)    8286  (87)
                                                8297  (87)    8455  (88)    8470  (88)    8480  (88)
                                                8490  (88)    8508  (88)    8518  (88)    8539  (88)
                                                8554  (88)    8565  (88)    8577  (88)    8734  (89)
                                                8748  (89)    8758  (89)    8768  (89)    8785  (89)
                                                8795  (89)    8815  (89)    8830  (89)    8840  (89)
                                                8851  (89)    9001  (90)    9016  (90)    9026  (90)
                                                9036  (90)    9058  (90)    9068  (90)    9083  (90)
                                                9101  (90)    9112  (90)    9128  (90)    9276  (91)
                                                9290  (91)    9300  (91)    9310  (91)    9330  (91)
                                                9340  (91)    9354  (91)    9372  (91)    9382  (91)
                                                9397  (91)    9499  (92)    9513  (92)    9523  (92)
                                                9545  (92)    9561  (92)    9571  (92)    9662  (93)
                                                9681  (93)    9689  (93)    9699  (93)    9773  (94)
                                                9790  (94)    9808  (94)

DS$K_ERROR                      =00000002       90      (2)
DS$K_NORMAL                     =00000001       90      (2)
DS$K_SEVERE                     =00000004       90      (2)
DS$K_SUBSYS                     =00000066       90      (2)     90      (2)
DS$K_WARNING                    =00000000       90      (2)
DS$PRINTF                        000100F0                       3173  (53)    3178  (53)    3183  (53)
DS$PRINTX                        000100E8                       3200  (53)    3262  (53)    3263  (53)    3264  (53)
```

```
                                                        3269    (53)    3270    (53)    3271    (53)    3276    (53)
                                                        3290    (53)    3292    (53)    3294    (53)    3300    (53)
                                                        3306    (53)    3309    (53)    3310    (53)    3316    (53)
                                                        3321    (53)    3610    (54)    3614    (54)    3616    (54)
                                                        3626    (54)
DS$SETIPL                       00010178                6692    (74)    6714    (74)    6725    (74)    9780    (94)
                                                        9803    (94)    9814    (94)
DS$SETVEC                       00010160                3674    (56)    4064    (60)    6397    (72)    6560    (73)
                                                        6676    (74)    6763    (76)    7153    (80)    9486    (92)
                                                        9649    (93)    9764    (94)
DS$_ARITH                       =006600D0       90      (2)
DS$_ASBE                        =00660118       90      (2)
DS$_BADLINK                     =006600F0       90      (2)
DS$_BADTYPE                     =006600E8       90      (2)
DS$_BIIC                        =00660120       90      (2)
DS$_CHME                        =006600A8       90      (2)
DS$_CHMK                        =006600E0       90      (2)
DS$_DEVNAME                     =00660108       90      (2)
DS$_ERROR                       =00660002       90      (2)
DS$_FHWE                        =00660068       90      (2)
DS$_FRAGBUF                     =00660080       90      (2)
DS$_ICBUSY                      =006600C8       90      (2)
DS$_ICERR                       =006600C0       90      (2)
DS$_IHWE                        =00660060       90      (2)
DS$_ILLCHAR                     =00660018       90      (2)
DS$_ILLPAGCNT                   =00660078       90      (2)
DS$_ILLUNIT                     =00660100       90      (2)
DS$_INSFMEM                     =00660050       90      (2)
DS$_IPL2HI                      =006600B8       90      (2)
DS$_IVADDR                      =00660040       90      (2)
DS$_IVVECT                      =00660038       90      (2)
DS$_KRNLSTK                     =00660090       90      (2)
DS$_LOGIC                       =00660070       90      (2)
DS$_MCHK                        =00660088       90      (2)
DS$_MMOFF                       =00660058       90      (2)
DS$_NEEDUNIT                    =006600F8       90      (2)
DS$_NODE                        =00660128       90      (2)
DS$_NOPCS                       =00660110       90      (2)
DS$_NORMAL                      =00660001       90      (2)
DS$_NOSUPPORT                   =006600B1       90      (2)
DS$_NOTDON                      =00660030       90      (2)
DS$_NOTIMP                      =006600B0       90      (2)     90      (2)
DS$_NULLSTR                     =00660010       90      (2)
DS$_OVERFLOW                    =00660008       90      (2)
DS$_POWER                       =00660098       90      (2)
DS$_PROGERR                     =00660020       90      (2)
DS$_SEVERE                      =00660004       90      (2)
DS$_TRANSL                      =006600A0       90      (2)
DS$_TRUNCATE                    =00660028       90      (2)
DS$_UNEXPINT                    =006600D8       90      (2)
DS$_VASFULL                     =00660048       90      (2)
DS$_WARNING                     =00660000       90      (2)     90      (2)
DUMP_14                          00002227-R     3624    (54)    3297    (53)    3307    (53)
DUMP_PKT                         000021E7-R     3608    (54)    3278    (53)
END_CODE                        =00000040       118     (2)     2138    (40)    2155    (40)    2172    (40)    2189    (41)
```

```
                                                    2206    (41)    2223    (41)    2240    (42)    2257    (42)
                                                    2273    (42)    2290    (43)    2308    (43)    2325    (43)
                                                    2342    (43)    2359    (44)    2376    (44)    2393    (44)
                                                    2410    (45)    2427    (45)    2443    (45)    2460    (46)
END_FLAG                    =00000002     104   (2) 2136    (40)    2153    (40)    2170    (40)    2187    (41)
                                                    2204    (41)    2221    (41)    2238    (42)    2255    (42)
                                                    2271    (42)    2288    (43)    2306    (43)    2323    (43)
                                                    2340    (43)    2357    (44)    2374    (44)    2391    (44)
                                                    2408    (45)    2425    (45)    2441    (45)    2458    (46)
ENV$M_DOMAIN                =00000002     72    (2)
ENV$M_LEVEL                 =00000001     72    (2)
ENV$M_SUPER                 =000003FC     72    (2)
ENV$S_DOMAIN                =00000001     72    (2)
ENV$S_LEVEL                 =00000001     72    (2)
ENV$S_SUPER                 =00000008     72    (2)
ENV$V_DOMAIN                =00000001     72    (2)   72    (2)
ENV$V_LEVEL                 =00000000     72    (2)   72    (2)
ENV$V_SUPER                 =00000002     72    (2)
ENV$_CPU                    =00000000     72    (2)   72    (2)
ENV$_FUNCTIONAL             =00000000     72    (2)   72    (2)
ENV$_REPAIR                 =00000001     72    (2)   72    (2)
ENV$_SUPER                  =00000001     72    (2)
ENV$_SYSTEM                 =00000001     72    (2)   72    (2)
ERR$_MSGADR                 =0000000C     89    (2)
ERR$_NARGS                  =0000000A     89    (2)
ERR$_NUM                    =00000004     89    (2)
ERR$_P1                     =00000014     89    (2)   3292  (53)    3294  (53)
ERR$_P2                     =00000018     89    (2)
ERR$_P3                     =0000001C     89    (2)
ERR$_P4                     =00000020     89    (2)
ERR$_P5                     =00000024     89    (2)
ERR$_P6                     =00000028     89    (2)
ERR$_POINTER                =00000010     89    (2)
ERR$_UNIT                   =00000008     89    (2)
FIND_END                     0000223D-R   3636  (54)   3304  (53)
HALT                        =00000004     94    (2)
INITIALIZE                  =00000001     113   (2)   1252  (22)     372  (5)
INIT_FLAG                   =00000004     105   (2)    355  (5)     356  (5)
INIT_SEQUENCE                00001F59-R   3342  (54)   3582  (54)    3682  (56)    4073  (60)
INT_ERR                      00001F3D-R   3314  (53)   6702  (74)    9790  (94)
IPR                         =00000006     94    (2)
L_COUNT                      00000006-R   161   (2) #-4625  (63) #-4635  (63) #-4914  (65) #-4924  (65)
                                                    #-6018  (70) #-6029  (70) #-6031  (70) #-7714  (83)
                                                    #-7724  (83) #-8003  (85) #-8013  (85) #-9107  (90)
                                                    #-9118  (90) #-9120  (90)
L_COUNT1                     0000000A-R   162   (2)
L_COUNT3                     0000000E-R   163   (2) #-5353  (68) #-5398  (68) #-5436  (68) #-5632  (69)
                                                    #-5676  (69) #-5710  (69) #-5712  (69) #-8442  (88)
                                                    #-8487  (88) #-8525  (88) #-8721  (89) #-8765  (89)
                                                    #-8799  (89) #-8801  (89)
MANUAL                      =00000001     94    (2)
MB_DIAGNOSE_CMD              00000318-R   1283  (22)   6973  (78)
MB_END_PACKET_1              00000660-R   2305  (43)   3112  (52) #-3639  (54)    6884  (77)    6986  (78)
                                                    7088  (79)
MB_END_PACKET_10             000006DE-R   2457  (46)
```

```
MB_END_PACKET_2                 0000066E-R  2322  (43)     7349  (81)
MB_END_PACKET_3                 0000067C-R  2339  (43)     7423  (81)
MB_END_PACKET_4                 0000068A-R  2356  (44)     2923  (52)     2930  (52)     2941  (52)     2948  (52)
                                                           3001  (52)     3008  (52)     3015  (52)     3022  (52)
                                                           3029  (52)     3036  (52)     3043  (52)     3050  (52)
                                                           3102  (52)     3109  (52)     3119  (52)     7587  (82)
                                                           7726  (83)     7875  (84)     8015  (85)
MB_END_PACKET_5                 00000698-R  2373  (44)     2954  (52)     2958  (52)     2966  (52)     2970  (52)
                                                           3066  (52)     3070  (52)     3074  (52)     3078  (52)
                                                           3082  (52)     3086  (52)     3090  (52)     3094  (52)
                                                           8160  (86)     8292  (87)     9555  (92)     9693  (93)
MB_END_PACKET_6                 000006A6-R  2390  (44)     2934  (52)     2962  (52)
MB_END_PACKET_7                 000006B4-R  2407  (45)     2983  (52)     2994  (52)
MB_END_PACKET_8                 000006C2-R  2424  (45)
MB_END_PACKET_9                 000006D0-R  2440  (45)     3057  (52)     3062  (52)
MB_INIT_CMD                     000002FC-R  1249  (22)     6871  (77)
MB_NOP_CMD                      0000030A-R  1266  (22)     7075  (79)     9769  (94)
MB_POS_1_CMD                    000005C6-R  2111  (39)     3111  (52)
MB_READ_10_CMD                  0000044C-R  1655  (30)     3003  (52)
MB_READ_11_CMD                  00000468-R  1689  (30)     3017  (52)
MB_READ_12_CMD                  00000484-R  1723  (31)
MB_READ_13_CMD                  000004A0-R  1757  (32)     3031  (52)
MB_READ_14_CMD                  000004BC-R  1791  (32)     3045  (52)
MB_READ_15_CMD                  000004D8-R  1824  (33)
MB_READ_16_CMD                  000004F4-R  1857  (34)     3059  (52)
MB_READ_17_CMD                  00000510-R  1891  (34)     3068  (52)
MB_READ_18_CMD                  0000052C-R  1924  (35)     3076  (52)
MB_READ_19_CMD                  00000548-R  1958  (36)
MB_READ_1_CMD                   00000326-R  1300  (23)     7328  (81)
MB_READ_20_CMD                  00000564-R  1992  (36)     3084  (52)
MB_READ_21_CMD                  00000580-R  2025  (37)     3092  (52)
MB_READ_22_CMD                  0000059C-R  2058  (38)
MB_READ_23_CMD                  000005AA-R  2075  (38)     3097  (52)     3114  (52)
MB_READ_24_CMD                  000005B8-R  2094  (38)     3104  (52)
MB_READ_2_CMD                   00000350-R  1350  (24)     7689  (83)
MB_READ_3_CMD                   0000036C-R  1384  (24)     8257  (87)     9658  (93)
MB_READ_4_CMD                   00000388-R  1417  (25)     7978  (85)
MB_READ_5_CMD                   000003C0-R  1485  (26)     2936  (52)
MB_READ_6_CMD                   000003CE-R  1502  (27)     2943  (52)
MB_READ_7_CMD                   00000406-R  1570  (28)     2964  (52)
MB_READ_8_CMD                   00000414-R  1587  (28)     2968  (52)
MB_READ_9_CMD                   00000430-R  1621  (29)     2985  (52)
MB_WRITE_10_CMD                 000003F8-R  1553  (28)     2960  (52)
MB_WRITE_11_CMD                 00000422-R  1604  (29)     2974  (52)
MB_WRITE_12_CMD                 0000043E-R  1638  (29)     2996  (52)
MB_WRITE_13_CMD                 0000045A-R  1672  (30)     3010  (52)
MB_WRITE_14_CMD                 00000476-R  1706  (31)
MB_WRITE_15_CMD                 00000492-R  1740  (31)     3024  (52)
MB_WRITE_16_CMD                 000004AE-R  1774  (32)     3038  (52)
MB_WRITE_17_CMD                 000004CA-R  1807  (33)
MB_WRITE_18_CMD                 000004E6-R  1841  (33)     3054  (52)
MB_WRITE_19_CMD                 00000502-R  1874  (34)     3064  (52)
MB_WRITE_1_CMD                  00000334-R  1317  (23)     7373  (81)
MB_WRITE_20_CMD                 0000051E-R  1907  (35)     3072  (52)
MB_WRITE_21_CMD                 0000053A-R  1941  (35)
```

```
MB_WRITE_22_CMD                 00000556-R   1975   (36)     3080   (52)
MB_WRITE_23_CMD                 00000572-R   2008   (37)     3088   (52)
MB_WRITE_24_CMD                 0000058E-R   2042   (37)
MB_WRITE_2_CMD                  00000342-R   1334   (23)     7536   (82)
MB_WRITE_3_CMD                  0000035E-R   1367   (24)     8112   (86)     9495   (92)
MB_WRITE_4_CMD                  0000037A-R   1400   (25)     7825   (84)
MB_WRITE_5_CMD                  00000396-R   1434   (25)     2918   (52)
MB_WRITE_6_CMD                  000003A4-R   1451   (26)     2925   (52)
MB_WRITE_7_CMD                  000003B2-R   1468   (26)     2932   (52)
MB_WRITE_8_CMD                  000003DC-R   1519   (27)     2952   (52)
MB_WRITE_9_CMD                  000003EA-R   1536   (27)     2956   (52)
MCHK                           =00000005     94    (2)
MCOMMAND_TBL_1                  000015B3-R   2918   (52)     8443   (88)
MCOMMAND_TBL_2                  0000161F-R   2952   (52)     8722   (89)
MCOMMAND_TBL_3                  0000165B-R   2974   (52)     8989   (90)
MCOMMAND_TBL_4                  0000176B-R   3054   (52)     9264   (91)
MCOMMAND_TBL_5                  000017EB-R   3097   (52)
MINIT_SEQUENCE                  00001FCB-R   3376   (54)     6771   (76)     7162   (80)
MODIFIER_00                    =00000000     123    (2)      1199   (21)     1218   (21)     1235   (22)     1253   (22)
                                                             1270   (22)     1287   (22)     1304   (23)     1321   (23)
                                                             1338   (23)     1354   (24)     1438   (25)     1455   (26)
                                                             1472   (26)     1489   (26)     1506   (27)     1608   (29)
                                                             1625   (29)     1642   (29)     1659   (30)     1676   (30)
                                                             1693   (30)     1710   (31)     1727   (31)     1744   (31)
                                                             1761   (32)     1778   (32)     1795   (32)     1811   (33)
                                                             1828   (33)     2079   (38)     2098   (38)     2115   (39)
                                                             373    (5)      390    (5)      407    (5)      424    (6)
                                                             441    (6)      458    (6)      474    (7)      558    (8)
                                                             575    (9)      592    (9)      609    (9)      626    (10)
                                                             728    (12)     745    (12)     762    (12)     779    (13)
                                                             796    (13)     813    (13)     830    (14)     847    (14)
                                                             864    (14)     881    (15)     898    (15)     915    (15)
                                                             931    (16)     948    (16)
MODIFIER_01                    =00000001     124    (2)      1404   (25)     1421   (25)     524    (8)      541    (8)
MODIFIER_80                    =00000080     125    (2)      1015   (17)     1031   (18)     1048   (18)     1065   (18)
                                                             1082   (19)     1099   (19)     1116   (19)     1132   (20)
                                                             1149   (20)     1166   (20)     1182   (21)     1371   (24)
                                                             1388   (24)     1523   (27)     1540   (27)     1557   (28)
                                                             1574   (28)     1591   (28)     1845   (33)     1861   (34)
                                                             1878   (34)     1895   (34)     1911   (35)     1928   (35)
                                                             1945   (35)     1962   (36)     1979   (36)     1996   (36)
                                                             2012   (37)     2029   (37)     2046   (37)     2062   (38)
                                                             491    (7)      508    (7)      643    (10)     660    (10)
                                                             677    (11)     694    (11)     711    (11)     965    (16)
                                                             981    (17)     998    (17)
MREAD_SERVICE                   0000216C-R   3540   (54)     9649   (93)
MREAD_SERVICE2                  000021AC-R   3571   (54)     9764   (94)
MRECEIVE_TU58                   000020C8-R   3457   (54)     3394   (54)     6883   (77)     6985   (78)     7087   (79)
                                                             7340   (81)     7386   (81)     7422   (81)     7549   (82)
                                                             7586   (82)     7701   (83)     7838   (84)     7874   (84)
                                                             7990   (85)     8124   (86)     8159   (86)     8269   (87)
                                                             8464   (88)     8501   (88)     8547   (88)     8742   (89)
                                                             8778   (89)     8823   (89)     9010   (90)     9051   (90)
                                                             9094   (90)     9284   (91)     9323   (91)     9365   (91)
                                                             9507   (92)     9554   (92)
```

```
MSG_009                         00000002-R   3649  (56)     3668  (56)
MSG_010                         00000002-R   4026  (60)     4059  (60)
MSG_011                         00000002-R   6738  (76)     6757  (76)
MSG_012                         00000002-R   7115  (80)     7148  (80)
MSG_1                           00001AD6-R   3176  (53)     4254  (61)     7343  (81)
MSG_2                           00001AE6-R   3181  (53)
M_CLOCK_FLAG                    =00000001     172  (2)    #-3522  (54)
M_DATA_FLAG                     =00000004     176  (2)    #-4617  (63)    #-4906  (65)    #-5185  (67)    #-5463  (68)
                                                          #-5739  (69)    #-6010  (70)    #-6281  (71)    #-6590  (73)
                                                          #-7706  (83)    #-7995  (85)    #-8274  (87)    #-8552  (88)
                                                          #-8828  (89)    #-9099  (90)    #-9370  (91)    #-9678  (93)
M_ENABLE                        =00000040     141  (2)    #-3420  (54)    #-3443  (54)    #-3462  (54)    #-6447  (72)
                                                          #-6448  (72)    #-6567  (73)    #-6582  (73)    #-6696  (74)
                                                          #-6697  (74)    #-6712  (74)    #-6713  (74)    #-9536  (92)
                                                          #-9537  (92)    #-9655  (93)    #-9670  (93)    #-9784  (94)
                                                          #-9785  (94)    #-9801  (94)    #-9802  (94)
M_END_FLAG                      =00000008     178  (2)    #-3799  (57)    #-3901  (58)    #-4003  (59)    #-4339  (61)
                                                          #-4502  (62)    #-4790  (64)    #-5075  (66)    #-5417  (68)
                                                          #-5694  (69)    #-5967  (70)    #-6239  (71)    #-6470  (72)
                                                          #-6888  (77)    #-6990  (78)    #-7092  (79)    #-7428  (81)
                                                          #-7591  (82)    #-7879  (84)    #-8164  (86)    #-8506  (88)
                                                          #-8783  (89)    #-9056  (90)    #-9328  (91)    #-9559  (92)
M_ERROR                         =80000000     144  (2)    #-3420  (54)    #-3424  (54)    #-3443  (54)    #-3447  (54)
                                                          #-3462  (54)    #-3466  (54)    #-3521  (54)    #-6447  (72)
                                                          #-6582  (73)    #-6696  (74)    #-6712  (74)    #-9536  (92)
                                                          #-9670  (93)    #-9784  (94)    #-9801  (94)
M_INTERRUPT                     =00000080     145  (2)    #-3424  (54)    #-3447  (54)    #-3466  (54)    #-3521  (54)
M_RD_INT_FLAG                   =00000004     188  (2)    #-3562  (54)    #-3572  (54)
M_RECEIVE_FLAG                  =00000002     174  (2)    #-3363  (54)    #-3397  (54)
M_REPEAT_CHECK                  =00000004     184  (2)    #-5898  (70)    #-6173  (71)    #-8987  (90)    #-9262  (91)
M_REPEAT_SEND                   =00000002     182  (2)    #-3705  (56)    #-4096  (60)    #-5898  (70)    #-5956  (70)
                                                          #-6173  (71)    #-6228  (71)    #-6794  (76)    #-7185  (80)
                                                          #-8987  (90)    #-9045  (90)    #-9262  (91)    #-9317  (91)
M_RUN                           =00000001     143  (2)    #-3420  (54)    #-3443  (54)    #-3462  (54)    #-6447  (72)
                                                          #-6582  (73)    #-6696  (74)    #-6712  (74)    #-9536  (92)
                                                          #-9670  (93)    #-9784  (94)    #-9801  (94)
M_SDONE_FLAG                    =00000002     186  (2)    #-3596  (54)
M_SEND_FLAG                     =00000010     180  (2)    #-3366  (54)    #-3400  (54)
M_TRANSFER                      =00000010     140  (2)    #-3416  (54)    #-3441  (54)    #-3460  (54)    #-6445  (72)
                                                          #-6580  (73)    #-6694  (74)    #-6710  (74)    #-9534  (92)
                                                          #-9668  (93)    #-9782  (94)    #-9799  (94)
NOT_USED                        =00000000     130  (2)      2141  (40)      2158  (40)      2175  (40)      2192  (41)
                                                            2209  (41)      2226  (41)      2243  (42)      2260  (42)
                                                            2276  (42)      2293  (43)
NO_INT_ERR                       00001F4B-R   3319  (53)     6719  (74)      9808  (94)
NO_OPERATION                    =00000000     112  (2)      1269  (22)       389  (5)
NO_READY                         00001BEB-R   3198  (53)     3687  (56)      3786  (57)      3888  (58)      3990  (59)
                                                            4078  (60)      4243  (61)      4288  (61)      4324  (61)
                                                            4451  (62)      4486  (62)      4604  (63)      4740  (64)
                                                            4775  (64)      4893  (65)      5027  (66)      5061  (66)
                                                            5172  (67)      5366  (68)      5401  (68)      5450  (68)
                                                            5645  (69)      5679  (69)      5726  (69)      5912  (70)
                                                            5947  (70)      5994  (70)      6187  (71)      6221  (71)
                                                            6265  (71)      6410  (72)      6574  (73)      6685  (74)
                                                            6776  (76)      6875  (77)      6977  (78)      7079  (79)
```

```
                                                        7167    (80)    7332    (81)    7377    (81)    7413    (81)
                                                        7540    (82)    7575    (82)    7693    (83)    7829    (84)
                                                        7864    (84)    7982    (85)    8116    (86)    8150    (86)
                                                        8261    (87)    8455    (88)    8490    (88)    8539    (88)
                                                        8734    (89)    8768    (89)    8815    (89)    9001    (90)
                                                        9036    (90)    9083    (90)    9276    (91)    9310    (91)
                                                        9354    (91)    9499    (92)    9662    (93)    9773    (94)
PAR$M_ATDEF                     =00000010       92      (2)
PAR$M_ATHI                      =00000008       92      (2)
PAR$M_ATLO                      =00000004       92      (2)
PAR$M_NODEF                     =00000002       92      (2)
PAR$V_ATDEF                     =00000004       92      (2)
PAR$V_ATHI                      =00000003       92      (2)
PAR$V_ATLO                      =00000002       92      (2)
PAR$V_NODEF                     =00000001       92      (2)
PAR$_BIN                        =00000002       92      (2)
PAR$_DEC                        =0000000A       92      (2)
PAR$_HEX                        =00000010       92      (2)
PAR$_NO                         =00000000       92      (2)     #-4280  (61)    #-7369  (81)
PAR$_OCT                        =00000008       92      (2)
PAR$_YES                        =00000001       92      (2)
PCS                             =00000008       94      (2)
POSITION                        =00000005       116     (2)       1234  (22)      2114  (39)
POWER_FAIL                      =00000003       94      (2)
PR$_ICCS                         00000000-XR                    #-3416  (54)    #-3420  (54)    #-3424  (54)    #-3441  (54)
                                                        #-3443  (54)    #-3447  (54)    #-3460  (54)    #-3462  (54)
                                                        #-3466  (54)    #-3520  (54)    #-3521  (54)    #-6445  (72)
                                                        #-6447  (72)    #-6580  (73)    #-6582  (73)    #-6694  (74)
                                                        #-6696  (74)    #-6710  (74)    #-6712  (74)    #-9534  (92)
                                                        #-9536  (92)    #-9668  (93)    #-9670  (93)    #-9782  (94)
                                                        #-9784  (94)    #-9799  (94)    #-9801  (94)
PR750$_CSRD                     =0000001D                       #-3350  (54)    #-3364  (54)    #-3384  (54)    #-3398  (54)
                                                        #-3448  (54)    #-3467  (54)    #-3532  (54)    #-3543  (54)
                                                        #-3575  (54)    #-6566  (73)    #-6691  (74)    #-9779  (94)
PR750$_CSRS                     =0000001C                       #-3444  (54)    #-3463  (54)    #-3541  (54)    #-3563  (54)
                                                        #-3573  (54)    #-6567  (73)    #-6585  (73)    #-6697  (74)
                                                        #-6701  (74)    #-6707  (74)    #-6713  (74)    #-6718  (74)
                                                        #-6724  (74)    #-9655  (93)    #-9673  (93)    #-9785  (94)
                                                        #-9789  (94)    #-9796  (94)    #-9802  (94)    #-9807  (94)
                                                        #-9813  (94)
PR750$_CSTD                     =0000001F                       #-3419  (54)    #-3549  (54)    #-3579  (54)    #-3592  (54)
PR750$_CSTS                     =0000001E                       #-3347  (54)    #-3381  (54)    #-3422  (54)    #-3550  (54)
                                                        #-3580  (54)    #-3597  (54)    #-6448  (72)    #-6453  (72)
                                                        #-9537  (92)    #-9542  (92)
PR750$_NICR                     =00000019                       #-3415  (54)    #-3417  (54)    #-3440  (54)    #-3442  (54)
                                                        #-3459  (54)    #-3461  (54)    #-6444  (72)    #-6446  (72)
                                                        #-6579  (73)    #-6581  (73)    #-6693  (74)    #-6695  (74)
                                                        #-6709  (74)    #-6711  (74)    #-9533  (92)    #-9535  (92)
                                                        #-9667  (93)    #-9669  (93)    #-9781  (94)    #-9783  (94)
                                                        #-9798  (94)    #-9800  (94)
READ                            =00000002       114     (2)       1014  (17)      1047  (18)      1081  (19)      1115  (19)
                                                          1148  (20)      1181  (21)      1198  (21)      1217  (21)
                                                          1303  (23)      1353  (24)      1387  (24)      1420  (25)
                                                          1488  (26)      1505  (27)      1573  (28)      1590  (28)
                                                          1624  (29)      1658  (30)      1692  (30)      1726  (31)
```

```
                                                        1760    (32)    1794    (32)    1827    (33)    1860    (34)
                                                        1894    (34)    1927    (35)    1961    (36)    1995    (36)
                                                        2028    (37)    2061    (38)    2078    (38)    2097    (38)
                                                         423    (6)      473    (7)      507    (7)      540    (8)
                                                         608    (9)      625    (10)     693    (11)     710    (11)
                                                         744    (12)     778    (13)     812    (13)     846    (14)
                                                         880    (15)     914    (15)     947    (16)     980    (17)
READ_SERVICE                    00002164-R    3531  (54)    6560    (73)
READ_SERVICE2                   000021A0-R    3561  (54)    6676    (74)
RECEIVE_TU58                    00002083-R    3438  (54)    3360    (54)    3794    (57)    3896    (58)    3998    (59)
                                                        4251    (61)    4297    (61)    4333    (61)    4460    (62)
                                                        4497    (62)    4612    (63)    4749    (64)    4785    (64)
                                                        4901    (65)    5035    (66)    5070    (66)    5180    (67)
                                                        5375    (68)    5412    (68)    5458    (68)    5653    (69)
                                                        5689    (69)    5734    (69)    5921    (70)    5962    (70)
                                                        6005    (70)    6195    (71)    6234    (71)    6276    (71)
                                                        6418    (72)    6465    (72)
REC_ERR                         00001EB4-R    3288  (53)    3695    (56)    3801    (57)    3903    (58)    4005    (59)
                                                        4086    (60)    4304    (61)    4341    (61)    4466    (62)
                                                        4504    (62)    4619    (63)    4755    (64)    4792    (64)
                                                        4908    (65)    5041    (66)    5077    (66)    5187    (67)
                                                        5381    (68)    5419    (68)    5465    (68)    5659    (69)
                                                        5696    (69)    5741    (69)    5927    (70)    5969    (70)
                                                        6012    (70)    6201    (71)    6241    (71)    6283    (71)
                                                        6424    (72)    6472    (72)    6593    (73)    6784    (76)
                                                        6890    (77)    6992    (78)    7094    (79)    7175    (80)
                                                        7393    (81)    7430    (81)    7555    (82)    7593    (82)
                                                        7708    (83)    7844    (84)    7881    (84)    7997    (85)
                                                        8130    (86)    8166    (86)    8276    (87)    8470    (88)
                                                        8508    (88)    8554    (88)    8748    (89)    8785    (89)
                                                        8830    (89)    9016    (90)    9058    (90)    9101    (90)
                                                        9290    (91)    9330    (91)    9372    (91)    9513    (92)
                                                        9561    (92)    9681    (93)
SCB$L_CSRD                      =000000F0     153   (2)   #-6560    (73)  #-6675    (74)  #-6676    (74)  #-6730    (74)
                                                      #-9649    (93)  #-9763    (94)  #-9764    (94)  #-9819    (94)
SCB$L_CSTD                      =000000F4     152   (2)   #-6397    (72)  #-6731    (74)  #-9486    (92)  #-9820    (94)
SCB$L_TIMER                      000000C0                 #-3674    (56)  #-4020    (59)  #-4064    (60)  #-6729    (74)
                                                      #-6763    (76)  #-7109    (79)  #-7153    (80)  #-9818    (94)
SEND_INT_ERR                     00001AC9-R    3171  (53)    6456    (72)    9545    (92)
SEND_TU58                        0000203D-R    3413  (54)    3348    (54)    3355    (54)    3382    (54)    3389    (54)
                                                        3473    (54)    3784    (57)    3886    (58)    3988    (59)
                                                        4241    (61)    4286    (61)    4322    (61)    4449    (62)
                                                        4484    (62)    4602    (63)    4738    (64)    4773    (64)
                                                        4891    (65)    5025    (66)    5059    (66)    5170    (67)
                                                        5364    (68)    5399    (68)    5448    (68)    5643    (69)
                                                        5677    (69)    5724    (69)    5910    (70)    5945    (70)
                                                        5992    (70)    6185    (71)    6219    (71)    6263    (71)
                                                        6408    (72)    6572    (73)    6683    (74)    6873    (77)
                                                        6975    (78)    7077    (79)    7330    (81)    7375    (81)
                                                        7411    (81)    7538    (82)    7573    (82)    7691    (83)
                                                        7827    (84)    7862    (84)    7980    (85)    8114    (86)
                                                        8148    (86)    8259    (87)    8453    (88)    8488    (88)
                                                        8537    (88)    8732    (89)    8766    (89)    8813    (89)
                                                        8999    (90)    9034    (90)    9081    (90)    9274    (91)
                                                        9308    (91)    9352    (91)    9497    (92)    9660    (93)
```

```
                                                        9771    (94)
SEP_FUNCTIONAL                  =00000002       72      (2)
SEP_REPAIR                      =00000003       72      (2)
SEQUENCE_H                      =00000000       128     (2)     1002    (17)    1019    (17)    1035    (18)    1052    (18)
                                                                1069    (18)    1086    (19)    1103    (19)    1120    (19)
                                                                1136    (20)    1153    (20)    1170    (20)    1186    (21)
                                                                1203    (21)    1222    (21)    1239    (22)    1257    (22)
                                                                1274    (22)    1291    (22)    1308    (23)    1325    (23)
                                                                1342    (23)    1358    (24)    1375    (24)    1392    (24)
                                                                1408    (25)    1425    (25)    1442    (25)    1459    (26)
                                                                1476    (26)    1493    (26)    1510    (27)    1527    (27)
                                                                1544    (27)    1561    (28)    1578    (28)    1595    (28)
                                                                1612    (29)    1629    (29)    1646    (29)    1663    (30)
                                                                1680    (30)    1697    (30)    1714    (31)    1731    (31)
                                                                1748    (31)    1765    (32)    1782    (32)    1799    (32)
                                                                1815    (33)    1832    (33)    1849    (33)    1865    (34)
                                                                1882    (34)    1899    (34)    1915    (35)    1932    (35)
                                                                1949    (35)    1966    (36)    1983    (36)    2000    (36)
                                                                2016    (37)    2033    (37)    2050    (37)    2066    (38)
                                                                2083    (38)    2102    (38)    2119    (39)    2143    (40)
                                                                2160    (40)    2177    (40)    2194    (41)    2211    (41)
                                                                2228    (41)    2245    (42)    2262    (42)    2278    (42)
                                                                2295    (43)    2313    (43)    2330    (43)    2347    (43)
                                                                2364    (44)    2381    (44)    2398    (44)    2415    (45)
                                                                2432    (45)    2448    (45)    2465    (46)    377     (5)
                                                                394     (5)     411     (5)     428     (6)     445     (6)
                                                                462     (6)     478     (7)     495     (7)     512     (7)
                                                                528     (8)     545     (8)     562     (8)     579     (9)
                                                                596     (9)     613     (9)     630     (10)    647     (10)
                                                                664     (10)    681     (11)    698     (11)    715     (11)
                                                                732     (12)    749     (12)    766     (12)    783     (13)
                                                                800     (13)    817     (13)    834     (14)    851     (14)
                                                                868     (14)    885     (15)    902     (15)    919     (15)
                                                                935     (16)    952     (16)    969     (16)    985     (17)
SEQUENCE_L                      =00000000       129     (2)     1001    (17)    1018    (17)    1034    (18)    1051    (18)
                                                                1068    (18)    1085    (19)    1102    (19)    1119    (19)
                                                                1135    (20)    1152    (20)    1169    (20)    1185    (21)
                                                                1202    (21)    1221    (21)    1238    (22)    1256    (22)
                                                                1273    (22)    1290    (22)    1307    (23)    1324    (23)
                                                                1341    (23)    1357    (24)    1374    (24)    1391    (24)
                                                                1407    (25)    1424    (25)    1441    (25)    1458    (26)
                                                                1475    (26)    1492    (26)    1509    (27)    1526    (27)
                                                                1543    (27)    1560    (28)    1577    (28)    1594    (28)
                                                                1611    (29)    1628    (29)    1645    (29)    1662    (30)
                                                                1679    (30)    1696    (30)    1713    (31)    1730    (31)
                                                                1747    (31)    1764    (32)    1781    (32)    1798    (32)
                                                                1814    (33)    1831    (33)    1848    (33)    1864    (34)
                                                                1881    (34)    1898    (34)    1914    (35)    1931    (35)
                                                                1948    (35)    1965    (36)    1982    (36)    1999    (36)
                                                                2015    (37)    2032    (37)    2049    (37)    2065    (38)
                                                                2082    (38)    2101    (38)    2118    (39)    2142    (40)
                                                                2159    (40)    2176    (40)    2193    (41)    2210    (41)
                                                                2227    (41)    2244    (42)    2261    (42)    2277    (42)
                                                                2294    (43)    2312    (43)    2329    (43)    2346    (43)
                                                                2363    (44)    2380    (44)    2397    (44)    2414    (45)
```

				2431 (45) 2447 (45) 2464 (46) 376 (5)
				393 (5) 410 (5) 427 (6) 444 (6)
				461 (6) 477 (7) 494 (7) 511 (7)
				527 (8) 544 (8) 561 (8) 578 (9)
				595 (9) 612 (9) 629 (10) 646 (10)
				663 (10) 680 (11) 697 (11) 714 (11)
				731 (12) 748 (12) 765 (12) 782 (13)
				799 (13) 816 (13) 833 (14) 850 (14)
				867 (14) 884 (15) 901 (15) 918 (15)
				934 (16) 951 (16) 968 (16) 984 (17)
SIZ...	=00000001	92	(2)	72 (2) 92 (2)
SUCCESS_CODE	=00000000	122	(2)	2139 (40) 2156 (40) 2173 (40) 2190 (41)
				2207 (41) 2224 (41) 2241 (42) 2258 (42)
				2274 (42) 2291 (43) 2309 (43) 2326 (43)
				2343 (43) 2360 (44) 2377 (44) 2394 (44)
				2411 (45) 2428 (45) 2444 (45) 2461 (46)
SUMMARY_STAT_H	=00000000	132	(2)	2147 (40) 2164 (40) 2181 (40) 2198 (41)
				2215 (41) 2232 (41) 2249 (42) 2266 (42)
				2282 (42) 2299 (43) 2317 (43) 2334 (43)
				2351 (43) 2368 (44) 2385 (44) 2402 (44)
				2419 (45) 2436 (45) 2452 (45) 2469 (46)
SUMMARY_STAT_L	=00000000	133	(2)	2146 (40) 2163 (40) 2180 (40) 2197 (41)
				2214 (41) 2231 (41) 2248 (42) 2265 (42)
				2281 (42) 2298 (43) 2316 (43) 2333 (43)
				2350 (43) 2367 (44) 2384 (44) 2401 (44)
				2418 (45) 2435 (45) 2451 (45) 2468 (46)
SWITCH_00	=00000000	126	(2)	1000 (17) 1017 (17) 1033 (18) 1050 (18)
				1067 (18) 1084 (19) 1101 (19) 1118 (19)
				1134 (20) 1151 (20) 1168 (20) 1184 (21)
				1201 (21) 1220 (21) 1237 (22) 375 (5)
				392 (5) 409 (5) 426 (6) 443 (6)
				460 (6) 476 (7) 493 (7) 510 (7)
				526 (8) 543 (8) 560 (8) 577 (9)
				594 (9) 611 (9) 628 (10) 645 (10)
				662 (10) 679 (11) 696 (11) 713 (11)
				730 (12) 747 (12) 764 (12) 781 (13)
				798 (13) 815 (13) 832 (14) 849 (14)
				866 (14) 883 (15) 900 (15) 917 (15)
				933 (16) 950 (16) 967 (16) 983 (17)
SWITCH_08	=00000008	127	(2)	1255 (22) 1272 (22) 1289 (22) 1306 (23)
				1323 (23) 1340 (23) 1356 (24) 1373 (24)
				1390 (24) 1406 (25) 1423 (25) 1440 (25)
				1457 (26) 1474 (26) 1491 (26) 1508 (27)
				1525 (27) 1542 (27) 1559 (28) 1576 (28)
				1593 (28) 1610 (29) 1627 (29) 1644 (29)
				1661 (30) 1678 (30) 1695 (30) 1712 (31)
				1729 (31) 1746 (31) 1763 (32) 1780 (32)
				1797 (32) 1813 (33) 1830 (33) 1847 (33)
				1863 (34) 1880 (34) 1897 (34) 1913 (35)
				1930 (35) 1947 (35) 1964 (36) 1981 (36)
				1998 (36) 2014 (37) 2031 (37) 2048 (37)
				2064 (38) 2081 (38) 2100 (38) 2117 (39)
				2311 (43) 2328 (43) 2345 (43) 2362 (44)
				2379 (44) 2396 (44) 2413 (45) 2430 (45)
				2446 (45) 2463 (46)

```
T10_S1                          00000131-R   4231   (61)
T10_S10                         000014D8-R   5896   (70)
T10_S10_X                       00001854-R   6046   (70)
T10_S11                         0000185F-R   6171   (71)
T10_S11_X                       00001BB1-R   6315   (71)
T10_S12                         00001BBC-R   6396   (72)
T10_S12_X                       00001DEB-R   6487   (72)
T10_S13                         00001DF6-R   6559   (73)
T10_S13_X                       00001F86-R   6616   (73)
T10_S14                         00001F91-R   6674   (74)
T10_S14_X                       00002105-R   6727   (74)
T10_S1_X                        00000436-R   4358   (61)   #-4279   (61)
T10_S2                          00000441-R   4439   (62)
T10_S2_X                        00000625-R   4519   (62)
T10_S3                          00000630-R   4592   (63)
T10_S3_X                        00000786-R   4648   (63)
T10_S4                          00000791-R   4728   (64)
T10_S4_X                        00000975-R   4807   (64)
T10_S5                          00000980-R   4881   (65)
T10_S5_X                        00000AD6-R   4935   (65)
T10_S6                          00000AE1-R   5014   (66)
T10_S6_X                        00000CBB-R   5092   (66)
T10_S7                          00000CC6-R   5160   (67)
T10_S7_X                        00000E0E-R   5213   (67)
T10_S8                          00000E19-R   5350   (68)
T10_S8_X                        00001186-R   5497   (68)
T10_S9                          00001191-R   5629   (69)
T10_S9_X                        000014CD-R   5771   (69)
T11_S1                          00000135-R   6864   (77)
T11_S1_X                        0000022D-R   6904   (77)
T11_S2                          00000238-R   6965   (78)
T11_S2_X                        00000330-R   7006   (78)
T11_S3                          0000033B-R   7067   (79)
T11_S3_X                        00000433-R   7108   (79)
T12_S1                          0000013D-R   7320   (81)
T12_S10                         000014E4-R   8985   (90)
T12_S10_X                       00001860-R   9135   (90)
T12_S11                         0000186B-R   9260   (91)
T12_S11_X                       00001BBD-R   9404   (91)
T12_S12                         00001BC8-R   9485   (92)
T12_S12_X                       00001DF7-R   9576   (92)
T12_S13                         00001E02-R   9648   (93)
T12_S13_X                       00001F8F-R   9704   (93)
T12_S14                         00001F9A-R   9762   (94)
T12_S14_X                       00002115-R   9816   (94)
T12_S1_X                        00000442-R   7447   (81)   #-7368   (81)
T12_S2                          0000044D-R   7528   (82)
T12_S2_X                        00000631-R   7608   (82)
T12_S3                          0000063C-R   7681   (83)
T12_S3_X                        00000792-R   7737   (83)
T12_S4                          0000079D-R   7817   (84)
T12_S4_X                        00000981-R   7896   (84)
T12_S5                          0000098C-R   7970   (85)
T12_S5_X                        00000AE2-R   8024   (85)
T12_S6                          00000AED-R   8103   (86)
```

T12_S6_X	00000CC7-R	8181	(86)								
T12_S7	00000CD2-R	8249	(87)								
T12_S7_X	00000E1A-R	8302	(87)								
T12_S8	00000E25-R	8439	(88)								
T12_S8_X	00001192-R	8586	(88)								
T12_S9	0000119D-R	8718	(89)								
T12_S9_X	000014D9-R	8860	(89)								
T9_S1	00000129-R	3775	(57)								
T9_S1_X	00000221-R	3815	(57)								
T9_S2	0000022C-R	3876	(58)								
T9_S2_X	00000324-R	3917	(58)								
T9_S3	0000032F-R	3978	(59)								
T9_S3_X	00000427-R	4019	(59)								
TEMP5	00000017-R	166	(2)	#-3468	(54)	#-3475	(54)	#-3545	(54)	#-3552	(54)
TEMP7	0000001B-R	167	(2)	#-3469	(54)	#-3474	(54)	#-3546	(54)	#-3553	(54)
TEST_009	00000018-R	3668	(56)	3668	(56)						
TEST_009_X	00000442-R	4022	(59)								
TEST_010	00000020-R	4059	(60)	4059	(60)						
TEST_010_X	0000213A-R	6733	(74)	#-4281	(61)						
TEST_011	00000024-R	6757	(76)	6757	(76)						
TEST_011_X	0000044E-R	7111	(79)								
TEST_012	0000002C-R	7148	(80)	7148	(80)						
TEST_012_X	0000214A-R	9822	(94)	#-7370	(81)						
TIMER_SERVICE	00002150-R	3519	(54)	3674	(56)	4064	(60)	6763	(76)	7153	(80)
TU58	=00000002	94	(2)	3668	(56)	4059	(60)	6757	(76)	7148	(80)
T_ACT_CONT	00001C68-R	3215	(53)	3264	(53)						
T_ACT_DATA	00001C9B-R	3221	(53)	3271	(53)						
T_ACT_END	00001DB5-R	3248	(53)	3306	(53)						
T_ACT_REC	00001E18-R	3254	(53)	3310	(53)						
T_BAD_CONT	00001BF8-R	3203	(53)	3262	(53)						
T_BAD_DATA	00001C37-R	3209	(53)	3269	(53)						
T_BAD_END	00001C19-R	3206	(53)	3276	(53)						
T_DUMP_14	00001E42-R	3257	(53)	3626	(54)						
T_DUMP_HDR	00001CBE-R	3224	(53)	3610	(54)						
T_DUMP_NOXOR	00001CF2-R	3230	(53)	3616	(54)						
T_DUMP_XOR	00001CDA-R	3227	(53)	3614	(54)						
T_EMPTY_BUF	00001D93-R	3245	(53)	3300	(53)						
T_EXP_CONT	00001C56-R	3212	(53)	3263	(53)						
T_EXP_DATA	00001C7A-R	3218	(53)	3270	(53)						
T_INIT1_ERR	0000183B-R	3124	(53)	3687	(56)	3695	(56)	3708	(56)	4078	(60)
				4086	(60)	4099	(60)	6776	(76)	6784	(76)
				6797	(76)	7167	(80)	7175	(80)	7188	(80)
T_INIT2_ERR	00001865-R	3127	(53)	3786	(57)	3801	(57)	3810	(57)	6875	(77)
				6890	(77)	6899	(77)				
T_INT_ERR	00001A2C-R	3163	(53)	3316	(53)						
T_IPL_ERR	00001A04-R	3160	(53)	6685	(74)	6702	(74)	6719	(74)	9773	(94)
				9790	(94)	9808	(94)				
T_MSG_1	00001AF6-R	3186	(53)	3178	(53)						
T_MSG_2	00001B28-R	3189	(53)	3183	(53)						
T_NOP_ERR	000018AD-R	3133	(53)	3990	(59)	4005	(59)	4014	(59)	7079	(79)
				7094	(79)	7103	(79)				
T_NO_INT_ERR	00001A65-R	3166	(53)	3321	(53)						
T_NO_READY	00001BB9-R	3196	(53)	3200	(53)						
T_OVERWRITE	00001B56-R	3192	(53)	4280	(61)	7369	(81)				
T_RD_BLK_ERR	000018EB-R	3139	(53)	4604	(63)	4619	(63)	4630	(63)	4642	(63)

```
                                                 5450  (68)     5465  (68)     5476  (68)     5488  (68)
                                                 5994  (70)     6012  (70)     6023  (70)     6039  (70)
                                                 7693  (83)     7708  (83)     7719  (83)     7731  (83)
                                                 8539  (88)     8554  (88)     8565  (88)     8577  (88)
                                                 9083  (90)     9101  (90)     9112  (90)     9128  (90)
T_RD_INT_ERR                     0000199F-R  3154  (53)     6574  (73)     6593  (73)     6601  (73)     6611  (73)
                                                 9662  (93)     9681  (93)     9689  (93)     9699  (93)
T_RD_MOD_ERR                     0000197A-R  3151  (53)     4893  (65)     4908  (65)     4919  (65)     4931  (65)
                                                 7982  (85)     7997  (85)     8008  (85)     8020  (85)
T_RD_REC_ERR                     00001931-R  3145  (53)     4243  (61)     4254  (61)     4267  (61)     5172  (67)
                                                 5187  (67)     5197  (67)     5208  (67)     5726  (69)
                                                 5741  (69)     5751  (69)     5762  (69)     6265  (71)
                                                 6283  (71)     6293  (71)     6308  (71)     7332  (81)
                                                 7343  (81)     7356  (81)     8261  (87)     8276  (87)
                                                 8286  (87)     8297  (87)     8815  (89)     8830  (89)
                                                 8840  (89)     8851  (89)     9354  (91)     9372  (91)
                                                 9382  (91)     9397  (91)
T_REC_CONT                       00001D47-R  3239  (53)   #-3695  (56)   #-4086  (60)   #-4304  (61)   #-4466  (62)
                                               #-4755  (64)   #-5041  (66)   #-5381  (68)   #-5659  (69)
                                               #-5927  (70)   #-6201  (71)   #-6424  (72)   #-6784  (76)
                                               #-7175  (80)   #-7393  (81)   #-7555  (82)   #-7844  (84)
                                               #-8130  (86)   #-8470  (88)   #-8748  (89)   #-9016  (90)
                                               #-9290  (91)   #-9513  (92)
T_REC_DATA                       00001D68-R  3242  (53)   #-4619  (63)   #-4908  (65)   #-5187  (67)   #-5465  (68)
                                               #-5741  (69)   #-6012  (70)   #-6283  (71)   #-6593  (73)
                                               #-7708  (83)   #-7997  (85)   #-8276  (87)   #-8554  (88)
                                               #-8830  (89)   #-9101  (90)   #-9372  (91)   #-9681  (93)
T_REC_END                        00001D2E-R  3236  (53)   #-3801  (57)   #-3903  (58)   #-4005  (59)   #-4341  (61)
                                               #-4504  (62)   #-4792  (64)   #-5077  (66)   #-5419  (68)
                                               #-5696  (69)   #-5969  (70)   #-6241  (71)   #-6472  (72)
                                               #-6890  (77)   #-6992  (78)   #-7094  (79)   #-7430  (81)
                                               #-7593  (82)   #-7881  (84)   #-8166  (86)   #-8508  (88)
                                               #-8785  (89)   #-9058  (90)   #-9330  (91)   #-9561  (92)
T_REC_ERR                        00001D04-R  3233  (53)     3290  (53)
T_SEND_INT_ERR                   00001A89-R  3169  (53)     3173  (53)
T_SLF_DIAG_ERR                   00001888-R  3130  (53)     3888  (58)     3903  (58)     3912  (58)     6977  (78)
                                                 6992  (78)     7001  (78)
T_UNREC_DATA                     00001DF4-R  3251  (53)     3309  (53)
T_WR_BLK_ERR                     000018C8-R  3136  (53)     4451  (62)     4466  (62)     4476  (62)     4486  (62)
                                                 4504  (62)     4514  (62)     5366  (68)     5381  (68)
                                                 5391  (68)     5401  (68)     5419  (68)     5429  (68)
                                                 5912  (70)     5927  (70)     5937  (70)     5947  (70)
                                                 5969  (70)     5979  (70)     7540  (82)     7555  (82)
                                                 7565  (82)     7575  (82)     7593  (82)     7603  (82)
                                                 8455  (88)     8470  (88)     8480  (88)     8490  (88)
                                                 8508  (88)     8518  (88)     9001  (90)     9016  (90)
                                                 9026  (90)     9036  (90)     9058  (90)     9068  (90)
T_WR_INT_ERR                     000019D1-R  3157  (53)     6410  (72)     6424  (72)     6434  (72)     6456  (72)
                                                 6472  (72)     6482  (72)     9499  (92)     9513  (92)
                                                 9523  (92)     9545  (92)     9561  (92)     9571  (92)
T_WR_MOD_ERR                     00001954-R  3148  (53)     4740  (64)     4755  (64)     4765  (64)     4775  (64)
                                                 4792  (64)     4802  (64)     7829  (84)     7844  (84)
                                                 7854  (84)     7864  (84)     7881  (84)     7891  (84)
T_WR_REC_ERR                     0000190D-R  3142  (53)     4288  (61)     4304  (61)     4314  (61)     4324  (61)
                                                 4341  (61)     4351  (61)     5027  (66)     5041  (66)
```

```
                                                 5051    (66)    5061    (66)    5077    (66)    5087    (66)
                                                 5645    (69)    5659    (69)    5669    (69)    5679    (69)
                                                 5696    (69)    5706    (69)    6187    (71)    6201    (71)
                                                 6211    (71)    6221    (71)    6241    (71)    6251    (71)
                                                 7377    (81)    7393    (81)    7403    (81)    7413    (81)
                                                 7430    (81)    7440    (81)    8116    (86)    8130    (86)
                                                 8140    (86)    8150    (86)    8166    (86)    8176    (86)
                                                 8734    (89)    8748    (89)    8758    (89)    8768    (89)
                                                 8785    (89)    8795    (89)    9276    (91)    9290    (91)
                                                 9300    (91)    9310    (91)    9330    (91)    9340    (91)
UNIT_0                  =00000000     131  (2)   1016    (17)    1032    (18)    1049    (18)    1066    (18)
                                                 1083    (19)    1100    (19)    1117    (19)    1133    (20)
                                                 1150    (20)    1167    (20)    1183    (21)    1200    (21)
                                                 1219    (21)    1236    (22)    1254    (22)    1271    (22)
                                                 1288    (22)    1305    (23)    1322    (23)    1339    (23)
                                                 1355    (24)    1372    (24)    1389    (24)    1405    (25)
                                                 1422    (25)    1439    (25)    1456    (26)    1473    (26)
                                                 1490    (26)    1507    (27)    1524    (27)    1541    (27)
                                                 1558    (28)    1575    (28)    1592    (28)    1609    (29)
                                                 1626    (29)    1643    (29)    1660    (30)    1677    (30)
                                                 1694    (30)    1711    (31)    1728    (31)    1745    (31)
                                                 1762    (32)    1779    (32)    1796    (32)    1812    (33)
                                                 1829    (33)    1846    (33)    1862    (34)    1879    (34)
                                                 1896    (34)    1912    (35)    1929    (35)    1946    (35)
                                                 1963    (36)    1980    (36)    1997    (36)    2013    (37)
                                                 2030    (37)    2047    (37)    2063    (38)    2080    (38)
                                                 2099    (38)    2116    (39)    2140    (40)    2157    (40)
                                                 2174    (40)    2191    (41)    2208    (41)    2225    (41)
                                                 2242    (42)    2259    (42)    2275    (42)    2292    (43)
                                                 2310    (43)    2327    (43)    2344    (43)    2361    (44)
                                                 2378    (44)    2395    (44)    2412    (45)    2429    (45)
                                                 2445    (45)    2462    (46)    374     (5)     391     (5)
                                                 408     (5)     425     (6)     442     (6)     459     (6)
                                                 475     (7)     492     (7)     509     (7)     525     (8)
                                                 542     (8)     559     (8)     576     (9)     593     (9)
                                                 610     (9)     627     (10)    644     (10)    661     (10)
                                                 678     (11)    695     (11)    712     (11)    729     (12)
                                                 746     (12)    763     (12)    780     (13)    797     (13)
                                                 814     (13)    831     (14)    848     (14)    865     (14)
                                                 882     (15)    899     (15)    916     (15)    932     (16)
                                                 949     (16)    966     (16)    982     (17)    999     (17)
V_CLOCK_FLAG            =00000000     171  (2)   #-3349  (54)   #-3356  (54)   #-3383  (54)   #-3390  (54)
                                                 #-3421  (54)   #-3445  (54)   #-3464  (54)   #-3785  (57)
                                                 #-3887  (58)   #-3989  (59)   #-4242  (61)   #-4287  (61)
                                                 #-4323  (61)   #-4450  (62)   #-4485  (62)   #-4603  (63)
                                                 #-4739  (64)   #-4774  (64)   #-4892  (65)   #-5026  (66)
                                                 #-5060  (66)   #-5171  (67)   #-5365  (68)   #-5400  (68)
                                                 #-5449  (68)   #-5644  (69)   #-5678  (69)   #-5725  (69)
                                                 #-5911  (70)   #-5946  (70)   #-5993  (70)   #-6186  (71)
                                                 #-6220  (71)   #-6264  (71)   #-6409  (72)   #-6452  (72)
                                                 #-6573  (73)   #-6584  (73)   #-6684  (74)   #-6699  (74)
                                                 #-6717  (74)   #-6874  (77)   #-6976  (78)   #-7078  (79)
                                                 #-7331  (81)   #-7376  (81)   #-7412  (81)   #-7539  (82)
                                                 #-7574  (82)   #-7692  (83)   #-7828  (84)   #-7863  (84)
                                                 #-7981  (85)   #-8115  (86)   #-8149  (86)   #-8260  (87)
```

```
                                                #-8454  (88)   #-8489  (88)   #-8538  (88)   #-8733  (89)
                                                #-8767  (89)   #-8814  (89)   #-9000  (90)   #-9035  (90)
                                                #-9082  (90)   #-9275  (91)   #-9309  (91)   #-9353  (91)
                                                #-9498  (92)   #-9541  (92)   #-9661  (93)   #-9672  (93)
                                                #-9772  (94)   #-9787  (94)   #-9806  (94)
V_DATA_FLAG                     =00000002  175  (2)  #-3291  (53)
V_DONE                          =00000007  137  (2)  #-3446  (54)   #-3465  (54)   #-3542  (54)   #-3574  (54)
V_DONE_FLAG                     =00000000  185  (2)
V_END_FLAG                      =00000003  177  (2)  #-3295  (53)
V_RD_INT_FLAG                   =00000002  189  (2)  #-6700  (74)   #-6716  (74)   #-9788  (94)   #-9805  (94)
V_READY                         =00000007  138  (2)  #-3423  (54)   #-3551  (54)   #-3581  (54)
V_RECEIVE_FLAG                  =00000001  173  (2)  #-3692  (56)   #-4083  (60)   #-6781  (76)   #-7172  (80)
V_REPEAT_CHECK                  =00000002  183  (2)  #-6002  (70)   #-6030  (70)   #-6273  (71)   #-6298  (71)
                                                #-9091  (90)   #-9119  (90)   #-9362  (91)   #-9387  (91)
V_REPEAT_SEND                   =00000001  181  (2)  #-3686  (56)   #-3693  (56)   #-3704  (56)   #-4077  (60)
                                                #-4084  (60)   #-4095  (60)   #-5954  (70)   #-6227  (71)
                                                #-6775  (76)   #-6782  (76)   #-6793  (76)   #-7166  (80)
                                                #-7173  (80)   #-7184  (80)   #-9043  (90)   #-9316  (91)
V_RESPONSE_FLAG                 =00000004  146  (2)
V_RUN                           =00000000  142  (2)
V_SDONE_FLAG                    =00000001  187  (2)  #-6451  (72)   #-9540  (92)
V_SEND_FLAG                     =00000004  179  (2)  #-3685  (56)   #-4076  (60)   #-6774  (76)   #-7165  (80)
V_TRANSFER                      =00000004  139  (2)
WCS                             =00000007   94  (2)
WRITE                           =00000003  115  (2)    1030  (18)     1064  (18)     1098  (19)     1131  (20)
                                                1165  (20)     1320  (23)     1337  (23)     1370  (24)
                                                1403  (25)     1437  (25)     1454  (26)     1471  (26)
                                                1522  (27)     1539  (27)     1556  (28)     1607  (29)
                                                1641  (29)     1675  (30)     1709  (31)     1743  (31)
                                                1777  (32)     1810  (33)     1844  (33)     1877  (34)
                                                1910  (35)     1944  (35)     1978  (36)     2011  (37)
                                                2045  (37)     440   (6)      457   (6)      490   (7)
                                                523   (8)      557   (8)      574   (9)      591   (9)
                                                642   (10)     659   (10)     676   (11)     727   (12)
                                                761   (12)     795   (13)     829   (14)     863   (14)
                                                897   (15)     930   (16)     964   (16)     997   (17)
WRITE_SERVICE                    000021D4-R  3591  (54)   6397  (72)     9486  (92)
XOFF_FLAG                       =00000013  108  (2)
XON_FLAG                        =00000011  107  (2)
```

Macros Cross Reference

MACRO	SIZE	DEFINITION	REFERENCES...
$D1_ABPROGRAM	1	3690 (56)	3690 (56) 3698 (56) 3711 (56) 3789 (57) 3804 (57) 3812 (57) 3891 (58) 3906 (58) 3914 (58) 3993 (59) 4008 (59) 4016 (59) 4081 (60) 4089 (60) 4102 (60) 4246 (61) 4258 (61) 4269 (61) 4291 (61) 4308 (61) 4317 (61) 4327 (61) 4345 (61) 4353 (61) 4454 (62) 4470 (62) 4479 (62) 4489 (62) 4508 (62) 4517 (62) 4607 (63) 4623 (63) 4633 (63) 4645 (63) 4743 (64) 4759 (64) 4768 (64) 4778 (64) 4796 (64) 4805 (64) 4896 (65) 4912 (65) 4922 (65) 4934 (65) 5030 (66) 5045 (66) 5054 (66) 5064 (66) 5081 (66) 5090 (66) 5175 (67) 5191 (67) 5200 (67) 5211 (67) 5369 (68) 5385 (68) 5394 (68) 5404 (68) 5423 (68) 5432 (68) 5453 (68) 5469 (68) 5479 (68) 5491 (68) 5648 (69) 5663 (69) 5672 (69) 5682 (69) 5700 (69) 5709 (69) 5729 (69) 5745 (69) 5754 (69) 5765 (69) 5915 (70) 5931 (70) 5940 (70) 5950 (70) 5973 (70) 5982 (70) 5997 (70) 6016 (70) 6026 (70) 6042 (70) 6190 (71) 6205 (71) 6214 (71) 6224 (71) 6245 (71) 6253 (71) 6268 (71) 6287 (71) 6296 (71) 6311 (71) 6413 (72) 6428 (72) 6437 (72) 6459 (72) 6476 (72) 6485 (72) 6577 (73) 6596 (73) 6604 (73) 6614 (73) 6688 (74) 6705 (74) 6722 (74) 6779 (76) 6787 (76) 6800 (76) 6878 (77) 6893 (77) 6901 (77) 6980 (78) 6995 (78) 7003 (78) 7082 (79) 7097 (79) 7105 (79) 7170 (80) 7178 (80) 7191 (80) 7335 (81) 7347 (81) 7358 (81) 7380 (81) 7397 (81) 7406 (81) 7416 (81) 7434 (81) 7442 (81) 7543 (82) 7559 (82) 7568 (82) 7578 (82) 7597 (82) 7606 (82) 7696 (83) 7712 (83) 7722 (83) 7734 (83) 7832 (84) 7848 (84) 7857 (84) 7867 (84) 7885 (84) 7894 (84) 7985 (85) 8001 (85) 8011 (85) 8023 (85) 8119 (86) 8134 (86) 8143 (86) 8153 (86) 8170 (86) 8179 (86) 8264 (87) 8280 (87) 8289 (87) 8300 (87) 8458 (88) 8474 (88) 8483 (88) 8493 (88) 8512 (88) 8521 (88) 8542 (88) 8558 (88) 8568 (88) 8580 (88) 8737 (89) 8752 (89) 8761 (89) 8771 (89) 8789 (89) 8798 (89) 8818 (89) 8834 (89) 8843 (89) 8854 (89) 9004 (90) 9020 (90) 9029 (90) 9039 (90) 9062 (90) 9071 (90) 9086 (90) 9105 (90) 9115 (90) 9131 (90) 9279 (91) 9294 (91) 9303 (91) 9313 (91) 9334 (91) 9342 (91) 9357 (91) 9376 (91) 9385 (91) 9400 (91) 9502 (92) 9517 (92) 9526 (92) 9548 (92) 9565 (92) 9574 (92) 9665 (93) 9684 (93) 9692 (93) 9702 (93) 9776 (94) 9793 (94) 9811 (94)
$D1_ABTEST	1	3689 (56)	3689 (56) 3697 (56) 3710 (56) 3788 (57) 3803 (57) 3890 (58) 3905 (58) 3992 (59) 4007 (59) 4080 (60) 4088 (60) 4101 (60) 4245 (61) 4256 (61) 4290 (61) 4306 (61) 4316 (61) 4326 (61) 4343 (61) 4453 (62) 4468 (62) 4478 (62) 4488 (62) 4506 (62) 4516 (62)

```
                                                 4606   (63)    4621   (63)    4632   (63)    4644   (63)    4742   (64)
                                                 4757   (64)    4767   (64)    4777   (64)    4794   (64)    4804   (64)
                                                 4895   (65)    4910   (65)    4921   (65)    4933   (65)    5029   (66)
                                                 5043   (66)    5053   (66)    5063   (66)    5079   (66)    5089   (66)
                                                 5174   (67)    5189   (67)    5199   (67)    5210   (67)    5368   (68)
                                                 5383   (68)    5393   (68)    5403   (68)    5421   (68)    5431   (68)
                                                 5452   (68)    5467   (68)    5478   (68)    5490   (68)    5647   (69)
                                                 5661   (69)    5671   (69)    5681   (69)    5698   (69)    5708   (69)
                                                 5728   (69)    5743   (69)    5753   (69)    5764   (69)    5914   (70)
                                                 5929   (70)    5939   (70)    5949   (70)    5971   (70)    5981   (70)
                                                 5996   (70)    6014   (70)    6025   (70)    6041   (70)    6189   (71)
                                                 6203   (71)    6213   (71)    6223   (71)    6243   (71)    6267   (71)
                                                 6285   (71)    6295   (71)    6310   (71)    6412   (72)    6426   (72)
                                                 6436   (72)    6458   (72)    6474   (72)    6484   (72)    6576   (73)
                                                 6595   (73)    6603   (73)    6613   (73)    6687   (74)    6704   (74)
                                                 6721   (74)    6778   (76)    6786   (76)    6799   (76)    6877   (77)
                                                 6892   (77)    6979   (78)    6994   (78)    7081   (79)    7096   (79)
                                                 7169   (80)    7177   (80)    7190   (80)    7334   (81)    7345   (81)
                                                 7379   (81)    7395   (81)    7405   (81)    7415   (81)    7432   (81)
                                                 7542   (82)    7557   (82)    7567   (82)    7577   (82)    7595   (82)
                                                 7605   (82)    7695   (83)    7710   (83)    7721   (83)    7733   (83)
                                                 7831   (84)    7846   (84)    7856   (84)    7866   (84)    7883   (84)
                                                 7893   (84)    7984   (85)    7999   (85)    8010   (85)    8022   (85)
                                                 8118   (86)    8132   (86)    8142   (86)    8152   (86)    8168   (86)
                                                 8178   (86)    8263   (87)    8278   (87)    8288   (87)    8299   (87)
                                                 8457   (88)    8472   (88)    8482   (88)    8492   (88)    8510   (88)
                                                 8520   (88)    8541   (88)    8556   (88)    8567   (88)    8579   (88)
                                                 8736   (89)    8750   (89)    8760   (89)    8770   (89)    8787   (89)
                                                 8797   (89)    8817   (89)    8832   (89)    8842   (89)    8853   (89)
                                                 9003   (90)    9018   (90)    9028   (90)    9038   (90)    9060   (90)
                                                 9070   (90)    9085   (90)    9103   (90)    9114   (90)    9130   (90)
                                                 9278   (91)    9292   (91)    9302   (91)    9312   (91)    9332   (91)
                                                 9356   (91)    9374   (91)    9384   (91)    9399   (91)    9501   (92)
                                                 9515   (92)    9525   (92)    9547   (92)    9563   (92)    9573   (92)
                                                 9664   (93)    9683   (93)    9691   (93)    9701   (93)    9775   (94)
                                                 9792   (94)    9810   (94)
$D1_BSUBT          1          3775   (57)       3775   (57)    3876   (58)    3978   (59)    4231   (61)    4439   (62)
                                                 4592   (63)    4728   (64)    4881   (65)    5014   (66)    5160   (67)
                                                 5350   (68)    5629   (69)    5896   (70)    6171   (71)    6396   (72)
                                                 6559   (73)    6674   (74)    6864   (77)    6965   (78)    7067   (79)
                                                 7320   (81)    7528   (82)    7681   (83)    7817   (84)    7970   (85)
                                                 8103   (86)    8249   (87)    8439   (88)    8718   (89)    8985   (90)
                                                 9260   (91)    9485   (92)    9648   (93)    9762   (94)
$D1_BTEST          1          3668   (56)       3668   (56)    4059   (60)    6757   (76)    7148   (80)
$D1_ERR            1          3687   (56)       3687   (56)    3695   (56)    3708   (56)    3786   (57)    3801   (57)
                                                 3810   (57)    3888   (58)    3903   (58)    3912   (58)    3990   (59)
                                                 4005   (59)    4014   (59)    4078   (60)    4086   (60)    4099   (60)
                                                 4243   (61)    4254   (61)    4267   (61)    4288   (61)    4304   (61)
                                                 4314   (61)    4324   (61)    4341   (61)    4351   (61)    4451   (62)
                                                 4466   (62)    4476   (62)    4486   (62)    4504   (62)    4514   (62)
                                                 4604   (63)    4619   (63)    4630   (63)    4642   (63)    4740   (64)
                                                 4755   (64)    4765   (64)    4775   (64)    4792   (64)    4802   (64)
                                                 4893   (65)    4908   (65)    4919   (65)    4931   (65)    5027   (66)
                                                 5041   (66)    5051   (66)    5061   (66)    5077   (66)    5087   (66)
                                                 5172   (67)    5187   (67)    5197   (67)    5208   (67)    5366   (68)
```

```
                                 5381  (68)    5391  (68)    5401  (68)    5419  (68)    5429  (68)
                                 5450  (68)    5465  (68)    5476  (68)    5488  (68)    5645  (69)
                                 5659  (69)    5669  (69)    5679  (69)    5696  (69)    5706  (69)
                                 5726  (69)    5741  (69)    5751  (69)    5762  (69)    5912  (70)
                                 5927  (70)    5937  (70)    5947  (70)    5969  (70)    5979  (70)
                                 5994  (70)    6012  (70)    6023  (70)    6039  (70)    6187  (71)
                                 6201  (71)    6211  (71)    6221  (71)    6241  (71)    6251  (71)
                                 6265  (71)    6283  (71)    6293  (71)    6308  (71)    6410  (72)
                                 6424  (72)    6434  (72)    6456  (72)    6472  (72)    6482  (72)
                                 6574  (73)    6593  (73)    6601  (73)    6611  (73)    6685  (74)
                                 6702  (74)    6719  (74)    6776  (76)    6784  (76)    6797  (76)
                                 6875  (77)    6890  (77)    6899  (77)    6977  (78)    6992  (78)
                                 7001  (78)    7079  (79)    7094  (79)    7103  (79)    7167  (80)
                                 7175  (80)    7188  (80)    7332  (81)    7343  (81)    7356  (81)
                                 7377  (81)    7393  (81)    7403  (81)    7413  (81)    7430  (81)
                                 7440  (81)    7540  (82)    7555  (82)    7565  (82)    7575  (82)
                                 7593  (82)    7603  (82)    7693  (83)    7708  (83)    7719  (83)
                                 7731  (83)    7829  (84)    7844  (84)    7854  (84)    7864  (84)
                                 7881  (84)    7891  (84)    7982  (85)    7997  (85)    8008  (85)
                                 8020  (85)    8116  (86)    8130  (86)    8140  (86)    8150  (86)
                                 8166  (86)    8176  (86)    8261  (87)    8276  (87)    8286  (87)
                                 8297  (87)    8455  (88)    8470  (88)    8480  (88)    8490  (88)
                                 8508  (88)    8518  (88)    8539  (88)    8554  (88)    8565  (88)
                                 8577  (88)    8734  (89)    8748  (89)    8758  (89)    8768  (89)
                                 8785  (89)    8795  (89)    8815  (89)    8830  (89)    8840  (89)
                                 8851  (89)    9001  (90)    9016  (90)    9026  (90)    9036  (90)
                                 9058  (90)    9068  (90)    9083  (90)    9101  (90)    9112  (90)
                                 9128  (90)    9276  (91)    9290  (91)    9300  (91)    9310  (91)
                                 9330  (91)    9340  (91)    9354  (91)    9372  (91)    9382  (91)
                                 9397  (91)    9499  (92)    9513  (92)    9523  (92)    9545  (92)
                                 9561  (92)    9571  (92)    9662  (93)    9681  (93)    9689  (93)
                                 9699  (93)    9773  (94)    9790  (94)    9808  (94)

$D1_ERR_S           1            3687  (56)    3687  (56)    3695  (56)    3708  (56)    3786  (57)    3801  (57)
                                 3810  (57)    3888  (58)    3903  (58)    3912  (58)    3990  (59)
                                 4005  (59)    4014  (59)    4078  (60)    4086  (60)    4099  (60)
                                 4243  (61)    4254  (61)    4267  (61)    4288  (61)    4304  (61)
                                 4314  (61)    4324  (61)    4341  (61)    4351  (61)    4451  (62)
                                 4466  (62)    4476  (62)    4486  (62)    4504  (62)    4514  (62)
                                 4604  (63)    4619  (63)    4630  (63)    4642  (63)    4740  (64)
                                 4755  (64)    4765  (64)    4775  (64)    4792  (64)    4802  (64)
                                 4893  (65)    4908  (65)    4919  (65)    4931  (65)    5027  (66)
                                 5041  (66)    5051  (66)    5061  (66)    5077  (66)    5087  (66)
                                 5172  (67)    5187  (67)    5197  (67)    5208  (67)    5366  (68)
                                 5381  (68)    5391  (68)    5401  (68)    5419  (68)    5429  (68)
                                 5450  (68)    5465  (68)    5476  (68)    5488  (68)    5645  (69)
                                 5659  (69)    5669  (69)    5679  (69)    5696  (69)    5706  (69)
                                 5726  (69)    5741  (69)    5751  (69)    5762  (69)    5912  (70)
                                 5927  (70)    5937  (70)    5947  (70)    5969  (70)    5979  (70)
                                 5994  (70)    6012  (70)    6023  (70)    6039  (70)    6187  (71)
                                 6201  (71)    6211  (71)    6221  (71)    6241  (71)    6251  (71)
                                 6265  (71)    6283  (71)    6293  (71)    6308  (71)    6410  (72)
                                 6424  (72)    6434  (72)    6456  (72)    6472  (72)    6482  (72)
                                 6574  (73)    6593  (73)    6601  (73)    6611  (73)    6685  (74)
                                 6702  (74)    6719  (74)    6776  (76)    6784  (76)    6797  (76)
                                 6875  (77)    6890  (77)    6899  (77)    6977  (78)    6992  (78)
```

```
                                 7001  (78)   7079  (79)   7094  (79)   7103  (79)   7167  (80)
                                 7175  (80)   7188  (80)   7332  (81)   7343  (81)   7356  (81)
                                 7377  (81)   7393  (81)   7403  (81)   7413  (81)   7430  (81)
                                 7440  (81)   7540  (82)   7555  (82)   7565  (82)   7575  (82)
                                 7593  (82)   7603  (82)   7693  (83)   7708  (83)   7719  (83)
                                 7731  (83)   7829  (84)   7844  (84)   7854  (84)   7864  (84)
                                 7881  (84)   7891  (84)   7982  (85)   7997  (85)   8008  (85)
                                 8020  (85)   8116  (86)   8130  (86)   8140  (86)   8150  (86)
                                 8166  (86)   8176  (86)   8261  (87)   8276  (87)   8286  (87)
                                 8297  (87)   8455  (88)   8470  (88)   8480  (88)   8490  (88)
                                 8508  (88)   8518  (88)   8539  (88)   8554  (88)   8565  (88)
                                 8577  (88)   8734  (89)   8748  (89)   8758  (89)   8768  (89)
                                 8785  (89)   8795  (89)   8815  (89)   8830  (89)   8840  (89)
                                 8851  (89)   9001  (90)   9016  (90)   9026  (90)   9036  (90)
                                 9058  (90)   9068  (90)   9083  (90)   9101  (90)   9112  (90)
                                 9128  (90)   9276  (91)   9290  (91)   9300  (91)   9310  (91)
                                 9330  (91)   9340  (91)   9354  (91)   9372  (91)   9382  (91)
                                 9397  (91)   9499  (92)   9513  (92)   9523  (92)   9545  (92)
                                 9561  (92)   9571  (92)   9662  (93)   9681  (93)   9689  (93)
                                 9699  (93)   9773  (94)   9790  (94)   9808  (94)
$D1_ESUBT          1     3815    (57)   3815  (57)   3917  (58)   4019  (59)   4358  (61)   4519  (62)
                                 4648  (63)   4807  (64)   4935  (65)   5092  (66)   5213  (67)
                                 5497  (68)   5771  (69)   6046  (70)   6315  (71)   6487  (72)
                                 6616  (73)   6727  (74)   6904  (77)   7006  (78)   7108  (79)
                                 7447  (81)   7608  (82)   7737  (83)   7896  (84)   8024  (85)
                                 8181  (86)   8302  (87)   8586  (88)   8860  (89)   9135  (90)
                                 9404  (91)   9576  (92)   9704  (93)   9816  (94)
$D1_ETEST          1     4022    (59)   4022  (59)   6733  (74)   7111  (79)   9822  (94)
$D1_EXSUB          1     4279    (61)   4279  (61)   7368  (81)
$D1_EXTEST         1     4281    (61)   4281  (61)   7370  (81)
$D1_PRINT_S        1     3173    (53)   3173  (53)   3178  (53)   3183  (53)   3200  (53)   3262  (53)
                                 3263  (53)   3264  (53)   3269  (53)   3270  (53)   3271  (53)
                                 3276  (53)   3290  (53)   3292  (53)   3294  (53)   3300  (53)
                                 3306  (53)   3309  (53)   3310  (53)   3316  (53)   3321  (53)
                                 3610  (54)   3614  (54)   3616  (54)   3626  (54)
$D1_SBTTL          2     3649    (56)   3649  (56)   3715  (57)   3819  (58)   3921  (59)   4026  (60)
                                 4106  (61)   4362  (62)   4523  (63)   4652  (64)   4811  (65)
                                 4938  (66)   5096  (67)   5217  (68)   5501  (69)   5775  (70)
                                 6050  (71)   6318  (72)   6490  (73)   6619  (74)   6738  (76)
                                 6804  (77)   6908  (78)   7010  (79)   7115  (80)   7195  (81)
                                 7451  (82)   7612  (83)   7741  (84)   7900  (85)   8027  (86)
                                 8185  (87)   8306  (88)   8590  (89)   8864  (90)   9139  (91)
                                 9407  (92)   9579  (93)   9707  (94)
$D2_BDATA          1     3668    (56)   3668  (56)   4059  (60)   6757  (76)   7148  (80)
$D2_BTEST          1     3668    (56)   3668  (56)   4059  (60)   6757  (76)   7148  (80)
$D2_SBTTL          1     3649    (56)   3649  (56)   4026  (60)   6738  (76)   7115  (80)
$DEF               1     92      (2)
$DEFINI            1     88      (2)    88    (2)    91    (2)    93    (2)
$DS_ABORT          1     3689    (56)   3689  (56)   3690  (56)   3697  (56)   3698  (56)   3710  (56)
                                 3711  (56)   3788  (57)   3789  (57)   3803  (57)   3804  (57)
                                 3812  (57)   3890  (58)   3891  (58)   3905  (58)   3906  (58)
                                 3914  (58)   3992  (59)   3993  (59)   4007  (59)   4008  (59)
                                 4016  (59)   4080  (60)   4081  (60)   4088  (60)   4089  (60)
                                 4101  (60)   4102  (60)   4245  (61)   4246  (61)   4256  (61)
                                 4258  (61)   4269  (61)   4290  (61)   4291  (61)   4306  (61)
```

4308 (61) 4316 (61) 4317 (61) 4326 (61) 4327 (61)
4343 (61) 4345 (61) 4353 (61) 4453 (62) 4454 (62)
4468 (62) 4470 (62) 4478 (62) 4479 (62) 4488 (62)
4489 (62) 4506 (62) 4508 (62) 4516 (62) 4517 (62)
4606 (63) 4607 (63) 4621 (63) 4623 (63) 4632 (63)
4633 (63) 4644 (63) 4645 (63) 4742 (64) 4743 (64)
4757 (64) 4759 (64) 4767 (64) 4768 (64) 4777 (64)
4778 (64) 4794 (64) 4796 (64) 4804 (64) 4805 (64)
4895 (65) 4896 (65) 4910 (65) 4912 (65) 4921 (65)
4922 (65) 4933 (65) 4934 (65) 5029 (66) 5030 (66)
5043 (66) 5045 (66) 5053 (66) 5054 (66) 5063 (66)
5064 (66) 5079 (66) 5081 (66) 5089 (66) 5090 (66)
5174 (67) 5175 (67) 5189 (67) 5191 (67) 5199 (67)
5200 (67) 5210 (67) 5211 (67) 5368 (68) 5369 (68)
5383 (68) 5385 (68) 5393 (68) 5394 (68) 5403 (68)
5404 (68) 5421 (68) 5423 (68) 5431 (68) 5432 (68)
5452 (68) 5453 (68) 5467 (68) 5469 (68) 5478 (68)
5479 (68) 5490 (68) 5491 (68) 5647 (69) 5648 (69)
5661 (69) 5663 (69) 5671 (69) 5672 (69) 5681 (69)
5682 (69) 5698 (69) 5700 (69) 5708 (69) 5709 (69)
5728 (69) 5729 (69) 5743 (69) 5745 (69) 5753 (69)
5754 (69) 5764 (69) 5765 (69) 5914 (70) 5915 (70)
5929 (70) 5931 (70) 5939 (70) 5940 (70) 5949 (70)
5950 (70) 5971 (70) 5973 (70) 5981 (70) 5982 (70)
5996 (70) 5997 (70) 6014 (70) 6016 (70) 6025 (70)
6026 (70) 6041 (70) 6042 (70) 6189 (71) 6190 (71)
6203 (71) 6205 (71) 6213 (71) 6214 (71) 6223 (71)
6224 (71) 6243 (71) 6245 (71) 6253 (71) 6267 (71)
6268 (71) 6285 (71) 6287 (71) 6295 (71) 6296 (71)
6310 (71) 6311 (71) 6412 (72) 6413 (72) 6426 (72)
6428 (72) 6436 (72) 6437 (72) 6458 (72) 6459 (72)
6474 (72) 6476 (72) 6484 (72) 6485 (72) 6576 (73)
6577 (73) 6595 (73) 6596 (73) 6603 (73) 6604 (73)
6613 (73) 6614 (73) 6687 (74) 6688 (74) 6704 (74)
6705 (74) 6721 (74) 6722 (74) 6778 (76) 6779 (76)
6786 (76) 6787 (76) 6799 (76) 6800 (76) 6877 (77)
6878 (77) 6892 (77) 6893 (77) 6901 (77) 6979 (78)
6980 (78) 6994 (78) 6995 (78) 7003 (78) 7081 (79)
7082 (79) 7096 (79) 7097 (79) 7105 (79) 7169 (80)
7170 (80) 7177 (80) 7178 (80) 7190 (80) 7191 (80)
7334 (81) 7335 (81) 7345 (81) 7347 (81) 7358 (81)
7379 (81) 7380 (81) 7395 (81) 7397 (81) 7405 (81)
7406 (81) 7415 (81) 7416 (81) 7432 (81) 7434 (81)
7442 (81) 7542 (82) 7543 (82) 7557 (82) 7559 (82)
7567 (82) 7568 (82) 7577 (82) 7578 (82) 7595 (82)
7597 (82) 7605 (82) 7606 (82) 7695 (83) 7696 (83)
7710 (83) 7712 (83) 7721 (83) 7722 (83) 7733 (83)
7734 (83) 7831 (84) 7832 (84) 7846 (84) 7848 (84)
7856 (84) 7857 (84) 7866 (84) 7867 (84) 7883 (84)
7885 (84) 7893 (84) 7894 (84) 7984 (85) 7985 (85)
7999 (85) 8001 (85) 8010 (85) 8011 (85) 8022 (85)
8023 (85) 8118 (86) 8119 (86) 8132 (86) 8134 (86)
8142 (86) 8143 (86) 8152 (86) 8153 (86) 8168 (86)
8170 (86) 8178 (86) 8179 (86) 8263 (87) 8264 (87)
8278 (87) 8280 (87) 8288 (87) 8289 (87) 8299 (87)

```
                                        8300   (87)    8457   (88)    8458   (88)    8472   (88)    8474   (88)
                                        8482   (88)    8483   (88)    8492   (88)    8493   (88)    8510   (88)
                                        8512   (88)    8520   (88)    8521   (88)    8541   (88)    8542   (88)
                                        8556   (88)    8558   (88)    8567   (88)    8568   (88)    8579   (88)
                                        8580   (88)    8736   (89)    8737   (89)    8750   (89)    8752   (89)
                                        8760   (89)    8761   (89)    8770   (89)    8771   (89)    8787   (89)
                                        8789   (89)    8797   (89)    8798   (89)    8817   (89)    8818   (89)
                                        8832   (89)    8834   (89)    8842   (89)    8843   (89)    8853   (89)
                                        8854   (89)    9003   (90)    9004   (90)    9018   (90)    9020   (90)
                                        9028   (90)    9029   (90)    9038   (90)    9039   (90)    9060   (90)
                                        9062   (90)    9070   (90)    9071   (90)    9085   (90)    9086   (90)
                                        9103   (90)    9105   (90)    9114   (90)    9115   (90)    9130   (90)
                                        9131   (90)    9278   (91)    9279   (91)    9292   (91)    9294   (91)
                                        9302   (91)    9303   (91)    9312   (91)    9313   (91)    9332   (91)
                                        9334   (91)    9342   (91)    9356   (91)    9357   (91)    9374   (91)
                                        9376   (91)    9384   (91)    9385   (91)    9399   (91)    9400   (91)
                                        9501   (92)    9502   (92)    9515   (92)    9517   (92)    9525   (92)
                                        9526   (92)    9547   (92)    9548   (92)    9563   (92)    9565   (92)
                                        9573   (92)    9574   (92)    9664   (93)    9665   (93)    9683   (93)
                                        9684   (93)    9691   (93)    9692   (93)    9701   (93)    9702   (93)
                                        9775   (94)    9776   (94)    9792   (94)    9793   (94)    9810   (94)
                                        9811   (94)
$DS_ASKLGCL_S      1          4280   (61)  4280   (61)    7369   (81)
$DS_BCOMPLETE      1          3811   (57)  3811   (57)    3913   (58)    4015   (59)    4268   (61)    4278   (61)
                                        4352   (61)    4643   (63)    6252   (71)    6900   (77)    7002   (78)
                                        7104   (79)    7357   (81)    7367   (81)    7441   (81)    7732   (83)
                                        9341   (91)
$DS_BGNMESSAGE     1          3172   (53)  3172   (53)    3177   (53)    3182   (53)    3199   (53)    3261   (53)
                                        3268   (53)    3275   (53)    3289   (53)    3315   (53)    3320   (53)
$DS_BGNMOD         1          72     (2)   72     (2)
$DS_BGNSUB         1          3775   (57)  3775   (57)    3876   (58)    3978   (59)    4231   (61)    4439   (62)
                                        4592   (63)    4728   (64)    4881   (65)    5014   (66)    5160   (67)
                                        5350   (68)    5629   (69)    5896   (70)    6171   (71)    6396   (72)
                                        6559   (73)    6674   (74)    6864   (77)    6965   (78)    7067   (79)
                                        7320   (81)    7528   (82)    7681   (83)    7817   (84)    7970   (85)
                                        8103   (86)    8249   (87)    8439   (88)    8718   (89)    8985   (90)
                                        9260   (91)    9485   (92)    9648   (93)    9762   (94)
$DS_BGNTEST        1          3668   (56)  3668   (56)    4059   (60)    6757   (76)    7148   (80)
$DS_BNCOMPLETE     1          3305   (53)  3305   (53)    3688   (56)    3696   (56)    3703   (56)    3709   (56)
                                        3787   (57)    3802   (57)    3809   (57)    3889   (58)    3904   (58)
                                        3911   (58)    3991   (59)    4006   (59)    4013   (59)    4079   (60)
                                        4087   (60)    4094   (60)    4100   (60)    4244   (61)    4255   (61)
                                        4266   (61)    4289   (61)    4305   (61)    4313   (61)    4315   (61)
                                        4325   (61)    4342   (61)    4350   (61)    4452   (62)    4467   (62)
                                        4475   (62)    4477   (62)    4487   (62)    4505   (62)    4513   (62)
                                        4515   (62)    4605   (63)    4620   (63)    4629   (63)    4631   (63)
                                        4641   (63)    4741   (64)    4756   (64)    4764   (64)    4766   (64)
                                        4776   (64)    4793   (64)    4801   (64)    4803   (64)    4894   (65)
                                        4909   (65)    4918   (65)    4920   (65)    4930   (65)    4932   (65)
                                        5028   (66)    5042   (66)    5050   (66)    5052   (66)    5062   (66)
                                        5078   (66)    5086   (66)    5088   (66)    5173   (67)    5188   (67)
                                        5196   (67)    5198   (67)    5207   (67)    5209   (67)    5367   (68)
                                        5382   (68)    5390   (68)    5392   (68)    5402   (68)    5420   (68)
                                        5428   (68)    5430   (68)    5451   (68)    5466   (68)    5475   (68)
                                        5477   (68)    5487   (68)    5489   (68)    5646   (69)    5660   (69)
```

				5668	(69)	5670	(69)	5680	(69)	5697	(69)	5705	(69)
				5707	(69)	5727	(69)	5742	(69)	5750	(69)	5752	(69)
				5761	(69)	5763	(69)	5913	(70)	5928	(70)	5936	(70)
				5938	(70)	5948	(70)	5970	(70)	5978	(70)	5980	(70)
				5995	(70)	6013	(70)	6022	(70)	6024	(70)	6038	(70)
				6040	(70)	6188	(71)	6202	(71)	6210	(71)	6212	(71)
				6222	(71)	6242	(71)	6250	(71)	6266	(71)	6284	(71)
				6292	(71)	6294	(71)	6307	(71)	6309	(71)	6411	(72)
				6425	(72)	6433	(72)	6435	(72)	6457	(72)	6473	(72)
				6481	(72)	6483	(72)	6575	(73)	6594	(73)	6600	(73)
				6602	(73)	6610	(73)	6612	(73)	6686	(74)	6703	(74)
				6720	(74)	6777	(76)	6785	(76)	6792	(76)	6798	(76)
				6876	(77)	6891	(77)	6898	(77)	6978	(78)	6993	(78)
				7000	(78)	7080	(79)	7095	(79)	7102	(79)	7168	(80)
				7176	(80)	7183	(80)	7189	(80)	7333	(81)	7344	(81)
				7355	(81)	7378	(81)	7394	(81)	7402	(81)	7404	(81)
				7414	(81)	7431	(81)	7439	(81)	7541	(82)	7556	(82)
				7564	(82)	7566	(82)	7576	(82)	7594	(82)	7602	(82)
				7604	(82)	7694	(83)	7709	(83)	7718	(83)	7720	(83)
				7730	(83)	7830	(84)	7845	(84)	7853	(84)	7855	(84)
				7865	(84)	7882	(84)	7890	(84)	7892	(84)	7983	(85)
				7998	(85)	8007	(85)	8009	(85)	8019	(85)	8021	(85)
				8117	(86)	8131	(86)	8139	(86)	8141	(86)	8151	(86)
				8167	(86)	8175	(86)	8177	(86)	8262	(87)	8277	(87)
				8285	(87)	8287	(87)	8296	(87)	8298	(87)	8456	(88)
				8471	(88)	8479	(88)	8481	(88)	8491	(88)	8509	(88)
				8517	(88)	8519	(88)	8540	(88)	8555	(88)	8564	(88)
				8566	(88)	8576	(88)	8578	(88)	8735	(89)	8749	(89)
				8757	(89)	8759	(89)	8769	(89)	8786	(89)	8794	(89)
				8796	(89)	8816	(89)	8831	(89)	8839	(89)	8841	(89)
				8850	(89)	8852	(89)	9002	(90)	9017	(90)	9025	(90)
				9027	(90)	9037	(90)	9059	(90)	9067	(90)	9069	(90)
				9084	(90)	9102	(90)	9111	(90)	9113	(90)	9127	(90)
				9129	(90)	9277	(91)	9291	(91)	9299	(91)	9301	(91)
				9311	(91)	9331	(91)	9339	(91)	9355	(91)	9373	(91)
				9381	(91)	9383	(91)	9396	(91)	9398	(91)	9500	(92)
				9514	(92)	9522	(92)	9524	(92)	9546	(92)	9562	(92)
				9570	(92)	9572	(92)	9663	(93)	9682	(93)	9688	(93)
				9690	(93)	9698	(93)	9700	(93)	9774	(94)	9791	(94)
				9809	(94)								
$DS_BREAK		1	3701	(56)	3701	(56)	3807	(57)	3909	(58)	4011	(59)	4022	(59)
					4092	(60)	4264	(61)	4276	(61)	4311	(61)	4348	(61)
					4473	(62)	4511	(62)	4627	(63)	4639	(63)	4762	(64)
					4799	(64)	4916	(65)	4928	(65)	5048	(66)	5084	(66)
					5194	(67)	5205	(67)	5388	(68)	5426	(68)	5473	(68)
					5485	(68)	5666	(69)	5703	(69)	5748	(69)	5759	(69)
					5934	(70)	5976	(70)	6020	(70)	6036	(70)	6208	(71)
					6248	(71)	6290	(71)	6305	(71)	6431	(72)	6450	(72)
					6479	(72)	6583	(73)	6598	(73)	6608	(73)	6698	(74)
					6715	(74)	6733	(74)	6790	(76)	6896	(77)	6998	(78)
					7100	(79)	7111	(79)	7181	(80)	7353	(81)	7365	(81)
					7400	(81)	7437	(81)	7562	(82)	7600	(82)	7716	(83)
					7728	(83)	7851	(84)	7888	(84)	8005	(85)	8017	(85)
					8137	(86)	8173	(86)	8283	(87)	8294	(87)	8477	(88)
					8515	(88)	8562	(88)	8574	(88)	8755	(89)	8792	(89)

				8837	(89)	8848	(89)	9023	(90)	9065	(90)	9109	(90)		
				9125	(90)	9297	(91)	9337	(91)	9379	(91)	9394	(91)		
				9520	(92)	9539	(92)	9568	(92)	9671	(93)	9686	(93)		
				9696	(93)	9786	(94)	9804	(94)	9822	(94)				
$DS_CLRVEC_S	1	4020	(59)	4020	(59)	6675	(74)	6729	(74)	6730	(74)	6731	(74)		
				7109	(79)	9763	(94)	9818	(94)	9819	(94)	9820	(94)		
$DS_DSDEF	2	90	(2)	90	(2)										
$DS_DSSDEF	8	91	(2)	91	(2)										
$DS_ENDDATA	1	3668	(56)	3668	(56)	4059	(60)	6757	(76)	7148	(80)				
$DS_ENDMESSAGE	1	3174	(53)	3174	(53)	3179	(53)	3184	(53)	3201	(53)	3265	(53)		
				3272	(53)	3279	(53)	3311	(53)	3317	(53)	3322	(53)		
$DS_ENDMOD	1	9823	(94)	9823	(94)										
$DS_ENDSUB	1	3815	(57)	3815	(57)	3917	(58)	4019	(59)	4358	(61)	4519	(62)		
				4648	(63)	4807	(64)	4935	(65)	5092	(66)	5213	(67)		
				5497	(68)	5771	(69)	6046	(70)	6315	(71)	6487	(72)		
				6616	(73)	6727	(74)	6904	(77)	7006	(78)	7108	(79)		
				7447	(81)	7608	(82)	7737	(83)	7896	(84)	8024	(85)		
				8181	(86)	8302	(87)	8586	(88)	8860	(89)	9135	(90)		
				9404	(91)	9576	(92)	9704	(93)	9816	(94)				
$DS_ENDTEST	1	4022	(59)	4022	(59)	6733	(74)	7111	(79)	9822	(94)				
$DS_ENVDEF	2	72	(2)	72	(2)										
$DS_ERRDEF	1	89	(2)	89	(2)										
$DS_ERRHARD_S	1	3687	(56)	3687	(56)	3694	(56)	3708	(56)	3786	(57)	3800	(57)		
				3810	(57)	3888	(58)	3902	(58)	3912	(58)	3990	(59)		
				4004	(59)	4014	(59)	4078	(60)	4085	(60)	4099	(60)		
				4243	(61)	4254	(61)	4267	(61)	4288	(61)	4303	(61)		
				4314	(61)	4324	(61)	4340	(61)	4351	(61)	4451	(62)		
				4465	(62)	4476	(62)	4486	(62)	4503	(62)	4514	(62)		
				4604	(63)	4618	(63)	4630	(63)	4642	(63)	4740	(64)		
				4754	(64)	4765	(64)	4775	(64)	4791	(64)	4802	(64)		
				4893	(65)	4907	(65)	4919	(65)	4931	(65)	5027	(66)		
				5040	(66)	5051	(66)	5061	(66)	5076	(66)	5087	(66)		
				5172	(67)	5186	(67)	5197	(67)	5208	(67)	5366	(68)		
				5380	(68)	5391	(68)	5401	(68)	5418	(68)	5429	(68)		
				5450	(68)	5464	(68)	5476	(68)	5488	(68)	5645	(69)		
				5658	(69)	5669	(69)	5679	(69)	5695	(69)	5706	(69)		
				5726	(69)	5740	(69)	5751	(69)	5762	(69)	5912	(70)		
				5926	(70)	5937	(70)	5947	(70)	5968	(70)	5979	(70)		
				5994	(70)	6011	(70)	6023	(70)	6039	(70)	6187	(71)		
				6200	(71)	6211	(71)	6221	(71)	6240	(71)	6251	(71)		
				6265	(71)	6282	(71)	6293	(71)	6308	(71)	6410	(72)		
				6423	(72)	6434	(72)	6456	(72)	6471	(72)	6482	(72)		
				6574	(73)	6592	(73)	6601	(73)	6611	(73)	6685	(74)		
				6702	(74)	6719	(74)	6776	(76)	6783	(76)	6797	(76)		
				6875	(77)	6889	(77)	6899	(77)	6977	(78)	6991	(78)		
				7001	(78)	7079	(79)	7093	(79)	7103	(79)	7167	(80)		
				7174	(80)	7188	(80)	7332	(81)	7343	(81)	7356	(81)		
				7377	(81)	7392	(81)	7403	(81)	7413	(81)	7429	(81)		
				7440	(81)	7540	(82)	7554	(82)	7565	(82)	7575	(82)		
				7592	(82)	7603	(82)	7693	(83)	7707	(83)	7719	(83)		
				7731	(83)	7829	(84)	7843	(84)	7854	(84)	7864	(84)		
				7880	(84)	7891	(84)	7982	(85)	7996	(85)	8008	(85)		
				8020	(85)	8116	(86)	8129	(86)	8140	(86)	8150	(86)		
				8165	(86)	8176	(86)	8261	(87)	8275	(87)	8286	(87)		
				8297	(87)	8455	(88)	8469	(88)	8480	(88)	8490	(88)		

```
                                8507  (88)    8518  (88)    8539  (88)    8553  (88)    8565  (88)
                                8577  (88)    8734  (89)    8747  (89)    8758  (89)    8768  (89)
                                8784  (89)    8795  (89)    8815  (89)    8829  (89)    8840  (89)
                                8851  (89)    9001  (90)    9015  (90)    9026  (90)    9036  (90)
                                9057  (90)    9068  (90)    9083  (90)    9100  (90)    9112  (90)
                                9128  (90)    9276  (91)    9289  (91)    9300  (91)    9310  (91)
                                9329  (91)    9340  (91)    9354  (91)    9371  (91)    9382  (91)
                                9397  (91)    9499  (92)    9512  (92)    9523  (92)    9545  (92)
                                9560  (92)    9571  (92)    9662  (93)    9680  (93)    9689  (93)
                                9699  (93)    9773  (94)    9790  (94)    9808  (94)
$DS_EXIT            1   4279    (61)  4279  (61)    4281  (61)    7368  (81)    7370  (81)
$DS_PAGE            1   3646    (54)  3646  (54)    3713  (56)    3817  (57)    3919  (58)    4024  (59)
                                4104  (60)    4360  (61)    4521  (62)    4650  (63)    4809  (64)
                                4936  (65)    5094  (66)    5215  (67)    5499  (68)    5773  (69)
                                6048  (70)    6316  (71)    6488  (72)    6617  (73)    6735  (74)
                                6802  (76)    6906  (77)    7008  (78)    7113  (79)    7193  (80)
                                7449  (81)    7610  (82)    7739  (83)    7898  (84)    8025  (85)
                                8183  (86)    8304  (87)    8588  (88)    8862  (89)    9137  (90)
                                9405  (91)    9577  (92)    9705  (93)
$DS_PARDEF          1   92      (2)   92    (2)
$DS_PRINTF_S        1   3173    (53)  3173  (53)    3178  (53)    3183  (53)
$DS_PRINTX_S        1   3200    (53)  3200  (53)    3262  (53)    3263  (53)    3264  (53)    3269  (53)
                                3270  (53)    3271  (53)    3276  (53)    3290  (53)    3292  (53)
                                3294  (53)    3300  (53)    3306  (53)    3309  (53)    3310  (53)
                                3316  (53)    3321  (53)    3610  (54)    3614  (54)    3616  (54)
                                3626  (54)
$DS_SBTTL           1   3649    (56)  3649  (56)    3715  (57)    3819  (58)    3921  (59)    4026  (60)
                                4106  (61)    4362  (62)    4523  (63)    4652  (64)    4811  (65)
                                4938  (66)    5096  (67)    5217  (68)    5501  (69)    5775  (70)
                                6050  (71)    6318  (72)    6490  (73)    6619  (74)    6738  (76)
                                6804  (77)    6908  (78)    7010  (79)    7115  (80)    7195  (81)
                                7451  (82)    7612  (83)    7741  (84)    7900  (85)    8027  (86)
                                8185  (87)    8306  (88)    8590  (89)    8864  (90)    9139  (91)
                                9407  (92)    9579  (93)    9707  (94)
$DS_SCBDEF          3   93      (2)   93    (2)
$DS_SECDEF          1   94      (2)   94    (2)
$DS_SETIPL_S        1   6692    (74)  6692  (74)    6714  (74)    6725  (74)    9780  (94)    9803  (94)
                                9814  (94)
$DS_SETVEC_S        1   3674    (56)  3674  (56)    4064  (60)    6397  (72)    6560  (73)    6676  (74)
                                6763  (76)    7153  (80)    9486  (92)    9649  (93)    9764  (94)
$EQU                1   92      (2)   72    (2)     90    (2)     92    (2)
$EQULS1             1   90      (2)   72    (2)     90    (2)
$EQULST             1   72      (2)   72    (2)     90    (2)
$GBLINI             2   72      (2)   72    (2)     90    (2)     92    (2)
$OFFDEF             1   89      (2)   89    (2)
$PR750DEF           1   88      (2)   88    (2)
$PUSHADR            1   3687    (56)  3687  (56)    3695  (56)    3708  (56)    3786  (57)    3801  (57)
                                3810  (57)    3888  (58)    3903  (58)    3912  (58)    3990  (59)
                                4005  (59)    4014  (59)    4078  (60)    4086  (60)    4099  (60)
                                4243  (61)    4254  (61)    4267  (61)    4280  (61)    4288  (61)
                                4304  (61)    4314  (61)    4324  (61)    4341  (61)    4351  (61)
                                4451  (62)    4466  (62)    4476  (62)    4486  (62)    4504  (62)
                                4514  (62)    4604  (63)    4619  (63)    4630  (63)    4642  (63)
                                4740  (64)    4755  (64)    4765  (64)    4775  (64)    4792  (64)
                                4802  (64)    4893  (65)    4908  (65)    4919  (65)    4931  (65)
```

```
                5027  (66)    5041  (66)    5051  (66)    5061  (66)    5077  (66)
                5087  (66)    5172  (67)    5187  (67)    5197  (67)    5208  (67)
                5366  (68)    5381  (68)    5391  (68)    5401  (68)    5419  (68)
                5429  (68)    5450  (68)    5465  (68)    5476  (68)    5488  (68)
                5645  (69)    5659  (69)    5669  (69)    5679  (69)    5696  (69)
                5706  (69)    5726  (69)    5741  (69)    5751  (69)    5762  (69)
                5912  (70)    5927  (70)    5937  (70)    5947  (70)    5969  (70)
                5979  (70)    5994  (70)    6012  (70)    6023  (70)    6039  (70)
                6187  (71)    6201  (71)    6211  (71)    6221  (71)    6241  (71)
                6251  (71)    6265  (71)    6283  (71)    6293  (71)    6308  (71)
                6410  (72)    6424  (72)    6434  (72)    6456  (72)    6472  (72)
                6482  (72)    6574  (73)    6593  (73)    6601  (73)    6611  (73)
                6685  (74)    6702  (74)    6719  (74)    6776  (76)    6784  (76)
                6797  (76)    6875  (77)    6890  (77)    6899  (77)    6977  (78)
                6992  (78)    7001  (78)    7079  (79)    7094  (79)    7103  (79)
                7167  (80)    7175  (80)    7188  (80)    7332  (81)    7343  (81)
                7356  (81)    7369  (81)    7377  (81)    7393  (81)    7403  (81)
                7413  (81)    7430  (81)    7440  (81)    7540  (82)    7555  (82)
                7565  (82)    7575  (82)    7593  (82)    7603  (82)    7693  (83)
                7708  (83)    7719  (83)    7731  (83)    7829  (84)    7844  (84)
                7854  (84)    7864  (84)    7881  (84)    7891  (84)    7982  (85)
                7997  (85)    8008  (85)    8020  (85)    8116  (86)    8130  (86)
                8140  (86)    8150  (86)    8166  (86)    8176  (86)    8261  (87)
                8276  (87)    8286  (87)    8297  (87)    8455  (88)    8470  (88)
                8480  (88)    8490  (88)    8508  (88)    8518  (88)    8539  (88)
                8554  (88)    8565  (88)    8577  (88)    8734  (89)    8748  (89)
                8758  (89)    8768  (89)    8785  (89)    8795  (89)    8815  (89)
                8830  (89)    8840  (89)    8851  (89)    9001  (90)    9016  (90)
                9026  (90)    9036  (90)    9058  (90)    9068  (90)    9083  (90)
                9101  (90)    9112  (90)    9128  (90)    9276  (91)    9290  (91)
                9300  (91)    9310  (91)    9330  (91)    9340  (91)    9354  (91)
                9372  (91)    9382  (91)    9397  (91)    9499  (92)    9513  (92)
                9523  (92)    9545  (92)    9561  (92)    9571  (92)    9662  (93)
                9681  (93)    9689  (93)    9699  (93)    9773  (94)    9790  (94)
                9808  (94)
$VIELD          1       72  (2)     72  (2)     92  (2)
$VIELD1         1       92  (2)     72  (2)     92  (2)
ECKAX_SECDEF    1       94  (2)     94  (2)
```

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	31	00:00:00.09	00:00:00.70
Command processing	898	00:00:00.67	00:00:01.90
Pass 1	4135	00:01:15.82	00:02:24.28
Symbol table sort	3	00:00:01.31	00:00:01.91
Pass 2	1896	00:00:21.81	00:00:53.67
Symbol table output	3	00:00:00.40	00:00:01.29
Psect synopsis output	3	00:00:00.03	00:00:00.03
Cross-reference output	335	00:00:13.19	00:00:44.46
Assembler run totals	7307	00:01:53.33	00:04:08.25

```
The working set limit was 4096 pages.
1097601 bytes (2144 pages) of virtual memory were used to buffer the intermediate code.
There were 70 pages of symbol table space allocated to hold 788 non-local and 593 local symbols.
9825 source lines were read in Pass 1, producing 98 object records in Pass 2.
97 pages of virtual memory were used to define 52 macros.
```

Macro library statistics

Macro library name	Macros defined
DISK$DIAGPACK02:[TAYLOR.ECKAX]ECKAX.MLB;1	1
SYS$COMMON:[SYSLIB]DIAG.MLB;955	45
SYS$COMMON:[SYSLIB]STARLET.MLB;2	8
TOTALS (all libraries)	54

```
724 GETS were required to define 54 macros.

There were no errors, warnings or information messages.

MACRO/LIS=ECKAX7.LIS/CROSS ECKAX7
```

Table of contents

(1) 1 ECKAX8: PATCH CONTROL STORE
(2) 61 DECLARATIONS
(3) 263 SUBROUTINES
(5) 498 ERROR MESSAGES
(7) 569 ERROR REPORTING ROUTINES
(8) 645 TEST 13: PCS Memory Test
(9) 692 SUBTEST 13.1: Data Path
(10) 775 SUBTEST 13.2: Row Select
(11) 848 SUBTEST 13.3: Address Path
(12) 919 SUBTEST 13.4: Moving Inversions
(13) 1052 TEST 14: PCS Execution Test
(14) 1096 SUBTEST 14.1: PCS Entry/Exit
(15) 1158 SUBTEST 14.2: PCS "Next Field" Addressing
(16) 1218 SUBTEST 14.3: PCS Parity Error ABORT

```
0000     1          .SBTTL  ECKAX8: PATCH CONTROL STORE
0000     2          .TITLE  ECKAX8  VAX-11/750 Specific CPU Cluster Exerciser
0000     3          .IDENT  /5.2/
0000     4
0000     5 ;
0000     6 ; Copyright (C) 1980, 1983,1986
0000     7 ; Digital Equipment Corporation, Maynard, Massachusetts 01754
0000     8 ;
0000     9 ; This software is furnished  under a license for use only on a single
0000    10 ; computer  system and  may be  copied only with  the inclusion of the
0000    11 ; above copyright notice.  This software, or any other copies thereof,
0000    12 ; may not be provided or  otherwise made available to any other person
0000    13 ; except for use on such system and to one who agrees to these license
0000    14 ; terms.  Title to and  ownership of the  software  shall at all times
0000    15 ; remain in DEC.
0000    16 ;
0000    17 ; The information in this software is subject to change without notice
0000    18 ; and should  not be construed  as a commitment  by Digital  Equipment
0000    19 ; Corporation.
0000    20 ;
0000    21 ; DEC assumes  no  responsibility  for  the use or  reliability of its
0000    22 ; software on equipment which is not supplied by DEC.
0000    23 ;
0000    24
0000    25 ;++
0000    26 ; Facility:     VAX Architecture Diagnostic.
0000    27 ;
0000    28 ; Abstract:     This module tests the patch contole store for parity
0000    29 ;               errors, addressing errors and sequence timing errors.
0000    30 ;
0000    31 ;
0000    32 ; Environment:  VAX Diagnostic Supervisor.
0000    33 ;
0000    34 ; Author:       Dave Shull      17-Sep-1982     Version 4.0
0000    35 ;
0000    36 ;
0000    37 ;       Dan Milleville  19-Mar-82               Version 3.4
0000    38 ;       Changed Test 3 exit code to accomodate temporarily a hardware problem.
0000    39 ;
0000    40 ;       Dave Shull      30-Nov-82               Version 4.0
0000    41 ;       Added tests 13 and 14 for coverage of PCS module.
0000    42 ;
0000    43 ;       Tai-Chun Pan    04-Mar-83               Version 5.0
0000    44 ;       Added test 5 for coverage of Processor Halts Architecture Undefined.
0000    45 ;       Added tests 11 and 12 for coverage of new ROM with MRSP of TU58.
0000    46 ;
0000    47 ;       Dan Milleville  21-Nov-83               Version 5.1
0000    48 ;       Fixed error in timer routine (didn't turn off timer).
0000    49 ;
0000    50 ;       Wayne R. Taylor February 1986           Version 5.2
0000    51 ;       Redefined IPR's to jive with starlet.
0000    52 ;       Modified the code for problem report Eckax5 where:
0000    53 ;               Tests 6 & 13 tests with cache off. They want cache on.
0000    54 ;               Subtest 1 does not check bit 0 of the memory under test.
0000    55 ;               Subtest 4 tests row 0, 1, 2, but not row 3.
```

```
0000     56 ;       Modifications were supplied by the submitter.
0000     57 ;       Search on 5.2
0000     58 ;
0000     59 ;--
```

```
                                        .SBTTL  DECLARATIONS
                                        .LIST   MEB
                                        .NLIST  CND
                                        .PSECT  ECKAXH, PAGE, NOWRT
                                        .LIBRARY        "SYS$LIBRARY:DIAG"; VAX family diagnostic library.
                                        $DS_BGNMOD      CEP_REPAIR, TN=13
                                    ;;;     Macro-32 Diagnostic macro library Version 8.3 "DIAG.MLB (245)"

                                ;
                                ; Include files:
                                ;

                                        .LIBRARY        "ECKAX"         ; CPU Cluster Exerciser library.


                                        $DS_SCBDEF
                                        $DS_DSADEF
                                        $DS_DSDEF
                                        $DS_PARDEF
                                        $DS_PSLDEF
                                        $DS_ERRDEF
                                        $DS_DSSDEF
                                        $DS_HPODEF
                                        $DS_KA_DEF
                                        ECKAX_SECDEF
                                        $pr750def       ; 5.2
                                ;
                                ; Own storage:
                                ;

00000004 0000   PCS$L_COUNT:    .BLKL                   ; used as a counter
00000008 0004   PCS$L_INC:      .BLKL                   ; used to store increment
0000000C 0008   PCS$L_ROW:      .BLKL                   ; used to store current row
00000014 000C   PCS$A_RETURN:   .BLKL   2               ; used to store return address
         0014

00000018 0014   PCS$L_FLAGS:    .BLKL                   ; contains the following flags
         0018

00000000 0018   PCS$V_PAT=0                             ; pattern done flag
00000001 0018   PCS$M_PAT=1@0                           ;
00000001 0018   PCS$V_DATA_ERR=1                        ; data error flag
00000002 0018   PCS$M_DATA_ERR=1@1                      ;
00000002 0018   PCS$V_ROW_ERR=2                         ; row error flag
00000004 0018   PCS$M_ROW_ERR=1@2                       ;
00000003 0018   PCS$V_REVERSE=3                         ; reverse direction flag
00000008 0018   PCS$M_REVERSE=1@3                       ;
00000005 0018   PCS$V_EXP_CS_PAR=5                      ; Expect Control Store Parity Error
00000020 0018   PCS$M_EXP_CS_PAR=1@5                    ;
         0018
         0018

00000060 0018   SCB$L_WTBUSERR=^X60                     ; write bus interrupt vector offset
0000000E 0018   PCS$V_BIT14=14                          ; bit position for bit 14
00080000 0018   PCS$M_BIT19=1@19                        ; bit mask for bit 19
00100000 0018   PCS$M_BIT20=1@20                        ; bit mask for bit 20
         0018
         0018   PCS$A_PCS_ADDRESS:
```

```
                00F08000  0018   118                    .LONG   ^XF08000        ; used to store address of PCS memory
                          001C   119
                          001C   120 PCS$A_ENA_ADDRESS:
                00F0C000  001C   121                    .LONG   ^XF0C000        ; address of PCS/Patch enable register
                          0020   122
                          0020   123 PCS$A_PTH_LOCATION:
                00F00C00  0020   124                    .LONG   ^XF00C00        ; location to set patch bit at
                          0024   125
                          0024   126 PCS$A_PTHBIT_ADDRESS:
                00F00000  0024   127                    .LONG   ^XF00000        ; address of start of patch bits
                          0028   128
                          0028   129 PCS$DATA_PATTERN:
                00200000  0028   130                    .LONG   ^X200000        ; floating one pattern
                FFDFFFFF  002C   131                    .LONG   ^XFFDFFFFF      ; floating zero pattern
                          0030   132
                000000B0  0030   133 PCS$A_PCS_BUF:     .BLKL   32              ; area used to store data
                          00B0   134
                          00B0   135 PCS$DECODED_WORDS:
                00000130  00B0   136                    .BLKL   32              ; area used to store decoded data words
                          0130   137
                          0130   138 PCS$NOISY_WORDS:
                000001B0  0130   139                    .BLKL   32              ; area used to store encoded data words
                          01B0   140
                          01B0   141 PCS$CODEVECTORS:
                0000FFFF  01B0   142                    .LONG   ^XFFFF          ; identity vector
                00005555  01B4   143                    .LONG   ^X5555          ; vector 1
                00003333  01B8   144                    .LONG   ^X3333          ; vector 2
                00000F0F  01BC   145                    .LONG   ^X0F0F          ; vector 3
                          01C0   146
                00000000  01C0   147 PCS$CODE_WORDS:    .LONG   ^X0000          ; encoded 0
                0000FFFF  01C4   148                    .LONG   ^XFFFF          ; encoded 1
                00005555  01C8   149                    .LONG   ^X5555          ; encoded 2
                0000AAAA  01CC   150                    .LONG   ^XAAAA          ; encoded 3
                00003333  01D0   151                    .LONG   ^X3333          ; encoded 4
                0000CCCC  01D4   152                    .LONG   ^XCCCC          ; encoded 5
                00006666  01D8   153                    .LONG   ^X6666          ; encoded 6
                00009999  01DC   154                    .LONG   ^X9999          ; encoded 7
                00000F0F  01E0   155                    .LONG   ^X0F0F          ; encoded 8
                0000F0F0  01E4   156                    .LONG   ^XF0F0          ; encoded 9
                00005A5A  01E8   157                    .LONG   ^X5A5A          ; encoded 10(decimal)
                          01EC   158
                00000000  01EC   159 PCS$DATA_TABLE:    .LONG   ^X00000
                00011111  01F0   160                    .LONG   ^X11111
                00033333  01F4   161                    .LONG   ^X33333
                00077777  01F8   162                    .LONG   ^X77777
                000FFFFF  01FC   163                    .LONG   ^XFFFFF
                000EEEEE  0200   164                    .LONG   ^XEEEEE
                000CCCCC  0204   165                    .LONG   ^XCCCCC
                00088888  0208   166                    .LONG   ^X88888
                00000000  020C   167                    .LONG   ^X00000
                          0210   168
                          0210   169
                          0210   170 PCS$TABLE1:
                0000000E  0210   171                    .LONG   14              ; Length for printsig
                00660088  0214   172                    .LONG   DS$_MCHK        ; Type of exception
```

```
00000028  0218   173                .LONG   ^X28              ; Length of stack logout
00000001  021C   174                .LONG   ^X1               ; Error code
00000000  0220   175                .LONG   ^X0               ; VA register
0000029C' 0224   176                .LONG   PCS$PTH_INST+1    ; PC at time or error
000017C1  0228   177                .LONG   ^X17C1            ; Memory Data Register
00000004  022C   178                .LONG   ^X4               ; Saved Mode Register
00000000  0230   179                .LONG   ^X0               ; read lock timeout register
00000000  0234   180                .LONG   ^X0               ; TB group parity error register
00000000  0238   181                .LONG   ^X0               ; CACHE error register
00000000  023C   182                .LONG   ^X0               ; Bus Error Register
00000000  0240   183                .LONG   ^X0               ; Machine Check error summary register
0000029B' 0244   184                .LONG   PCS$PTH_INST      ; Interrupt / Exception PC
04000000  0248   185                .LONG   ^X04000000        ; Interrupt / Exception PSL
          024C   186
          024C   187 ;
          024C   188 ; The following miro code data is used to test the functionlity of the Patch
          024C   189 ; Control Store.  After loading this microcode into PCS RAM the following
          024C   190 ; steps are performed to execute from PCS:
          024C   191 ;
          024C   192 ;       1.  The patch bit for CCS location 300 is set ( this is the location
          024C   193 ;           for the NOP opcode).  The next address field for location 300 is
          024C   194 ;           0002.
          024C   195 ;       2.  A NOP instruction will be executed and when the microcode finishes
          024C   196 ;           at location 300, instead of going to 0002 (because the patch bit
          024C   197 ;           is set), control will go to location 2802.
          024C   198 ;       3.  At this point execution depends on whether PCS was loaded with
          024C   199 ;           just the first 3 micro words or more.  The specific test will
          024C   200 ;           determine what the state of PCS is.
          024C   201 ;
          024C   202 PCS$MICRO_DATA:
          024C   203                                            ; entry and exit micro words
          024C   204                                            ; next field inverted in the first 20
          024C   205                                            ; bits.
000097C1  024C   206                .LONG   ^X000097C1          ; First microword:
00054047  0250   207                .LONG   ^X00054047          ;       R[R5]_D,DTYPE/LONG,NEXT/2801
000B2402  0254   208                .LONG   ^X000B2402
00008405  0258   209                .LONG   ^X00008405
          025C   210
00003FC2  025C   211                .LONG   ^X00003FC2          ; Second Microword:
00000047  0260   212                .LONG   ^X00000047          ;       NOP,NEXT/0002
00036403  0264   213                .LONG   ^X00036403          ; Exit Microword
000C8000  0268   214                .LONG   ^X000C8000
          026C   215
000097C3  026C   216                .LONG   ^X000097C3          ; Third Microword:
00000047  0270   217                .LONG   ^X00000047          ;       NOP,CLKX/XTND,NEXT/2803
00036403  0274   218                .LONG   ^X00036403
000C8000  0278   219                .LONG   ^X000C8000
          027C   220
000017C4  027C   221                .LONG   ^X000017C4          ; Fourth Microword:
00000047  0280   222                .LONG   ^X00000047          ;       NOP,NEXT/2804
00036403  0284   223                .LONG   ^X00036403
000C8000  0288   224                .LONG   ^X000C8000
          028C   225
          028C   226        ;
          028C   227        ; The following is the entry micro word.  When loading the micro words
```

```
                     028C   228          ; if there is to be micro words loaded after the this location then
                     028C   229          ; the next address (normally the first .LONG) of 2800 is changed to
                     028C   230          ; a next address of 2803 (the fifth .LONG).
                     028C   231          ;
000097C0             028C   232                  .LONG   ^X000097C0      ; Fifth Microword:
00054047             0290   233                  .LONG   ^X00054047      ;       D_R[R5]-1,DTYPE/LONG,NEXT/2800
0007D202             0294   234                  .LONG   ^X0007D202      ; Entry Microword
0008800E             0298   235                  .LONG   ^X0008800E
000097C5             029C   236                  .LONG   ^X000097C5
                     02A0   237
                     02A0   238                                          ; these used to build rest of u words
                     02A0   239                                          ; next field not yet inverted and last
                     02A0   240                                          ; section clears parity depending on
                     02A0   241                                          ; next field odd or even.
                     02A0   242                                          ; Common Microword:
                     02A0   243                                          ;       D_D-1,DTYPE/LONG,NEXT/28xx
00000047             02A0   244                  .LONG   ^X00000047      ; common for second section of u word
00071202             02A4   245                  .LONG   ^X00071202      ; common for third section of u word
0000A806             02A8   246                  .LONG   ^X0000A806      ; next field for filling PCS
000C800E             02AC   247                  .LONG   ^X000C800E      ; fourth section of u word
0000A800             02B0   248                  .LONG   ^X0000A800      ; next field for going to exit point
                     02B4   249
                     02B4   250 PCS$PAR_ERR_WORD:
                     02B4   251
00088405             02B4   252                  .LONG   ^X00088405      ; This microword has the P2 bit clear
                     02B8   253                                          ; which when used as the Fourth section
                     02B8   254                                          ; of the first microword (reference the
                     02B8   255                                          ; previous microwords) causes a Control
                     02B8   256                                          ; store parity error.
                     02B8   257
                     02B8   258
```

```
                                02B8    263 .SBTTL  SUBROUTINES
                                02B8    264
                                02B8    265
                                02B8    266 ; This subroutine is used to clear the data buffer areas in the beginning
                                02B8    267 ; of this program.
                                02B8    268
                                02B8    269
                                02B8    270 PCS$CLEAR_BUFFER:
                55    FD74 CF   DE    02B8    271          MOVAL   PCS$A_PCS_BUF,R5        ; get starting buffer address
                      FD3F CF   D4    02BD    272          CLRL    PCS$L_COUNT             ; initialize counter
                           85   D4    02C1    273 1$:      CLRL    (R5)+                   ; clear a buffer location
     F4 FD34 CF    00000060 8F   F3    02C3    274          AOBLEQ  #96,PCS$L_COUNT,1$      ; br = not finished
                           05   02CD    275          RSB                             ; return
                                02CE    276
                                02CE    277 ;
                                02CE    278 ; This routine is used to initailly zero PCS
                                02CE    279 ;
                                02CE    280
                                02CE    281 PCS$CLEAR_PCS:
                55    FD52 CF   D0    02CE    282          MOVL    PCS$A_PTHBIT_ADDRESS,R5 ; get starting address of patch bits
                FD44 DF     01   D0    02D3    283          MOVL    #1,@PCS$A_ENA_ADDRESS   ; Enable writing of patch bits
                      FD24 CF   D4    02D8    284          CLRL    PCS$L_COUNT             ; clear the counter
                           85   01   D0    02DC    285 10$:     MOVL    #1,(R5)+                ; Disable the patch bit
     F3 FD18 CF    00001FFF 8F   F3    02DF    286          AOBLEQ  #8191,PCS$L_COUNT,10$   ; br = not finished
                55    FD2B CF   D0    02E9    287          MOVL    PCS$A_PCS_ADDRESS,R5    ; get starting PCS address
                      FD2A DF   D4    02EE    288          CLRL    @PCS$A_ENA_ADDRESS      ; Enable writing of PCS
                      FD0A CF   D4    02F2    289          CLRL    PCS$L_COUNT             ; initialize counter
                           85   D4    02F6    290 20$:     CLRL    (R5)+                   ; clear a buffer location
     F4 FCFF CF    00000FFF 8F   F3    02F8    291          AOBLEQ  #4095,PCS$L_COUNT,20$   ; br = not finished
                           05   0302    292          RSB                             ; return
                                0303    293
                                0303    294
                                0303    295 ; This routine is used to decode data read from the PCS that has been encoded
                                0303    296 ; in the REED - MULLER code for the address path subtest.
                                0303    297
                                0303    298 PCS$RM_DECODE:
                     03FF 8F    BB    0303    299          PUSHR   #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8,R9>
                          52    D4    0307    300          CLRL    R2                      ; initialize word counter
                     54   0B    D0    0309    301          MOVL    #11,R4                  ; initialize number of words to decode
                   FD9F CF42    D4    030C    302 10$:     CLRL    PCS$DECODED_WORDS[R2]   ; initialize decoded word storage
                     53   01    D0    0311    303          MOVL    #1,R3                   ; initialize the pair seperation
                     55   01    D0    0314    304          MOVL    #1,R5                   ; initialize the message bit counter
                     56   0F    D0    0317    305 20$:     MOVL    #15,R6                  ; initialize the code word bit position
                          58    D4    031A    306          CLRL    R8                      ; initialize the population counter
                     55   01    D1    031C    307          CMPL    #1,R5                   ; if decoding bit one, skip next line
                          04    13    031F    308          BEQL    30$                     ; br = do not update pair seperation
                53   53   01    78    0321    309          ASHL    #1,R3,R3                ; update pair seperation
              57    FE06 CF42    D0    0325    310 30$:     MOVL    PCS$NOISY_WORDS[R2],R7  ; get the encoded word
                05 57    56    E1    032B    311          BBC     R6,R7,40$               ; br = codeword bit not set and store zero
                     50   01    D0    032F    312          MOVL    #1,R0                   ; store a one for bit set in first of pair
                          02    11    0332    313          BRB     50$                     ; skip
                          50    D4    0334    314 40$:     CLRL    R0                      ; store a zero for bit clear
                     56   53    C2    0336    315 50$:     SUBL2   R3,R6                   ; point to the next bit of the pair
                05 57    56    E1    0339    316          BBC     R6,R7,60$               ; br = codeword bit not set and store zero
                     51   01    D0    033D    317          MOVL    #1,R1                   ; store a one for bit set in second of pair
```

```
                  02  11  0340   318          BRB     70$                      ; skip
                  51  D4  0342   319 60$:     CLRL    R1                       ; store a zero for bit clear
            51    50  CC  0344   320 70$:     XORL2   R0,R1                    ; compute the value of the relation
                  02  13  0347   321          BEQL    80$                      ; br = value is not a one
                  58  D6  0349   322          INCL    R8                       ; bump the population counter
      50    01    55  78  034B   323 80$:     ASHL    R5,#1,R0                 ; calculate 2**R5 for message bit
  59  00    56    01  7A  034F   324          EMUL    #1,R6,#0,R9              ;
  50  50    59    50  7B  0354   325          EDIV    R0,R9,R0,R0              ;
                  50  D5  0359   326          TSTL    R0                       ;
                  03  13  035B   327          BEQL    90$                      ; br =
            56    53  C0  035D   328          ADDL2   R3,R6                    ;
              C2  56  F4  0360   329 90$:     SOBGEQ  R6,30$                   ;
            04    58  D1  0363   330          CMPL    R8,#4                    ;
                  09  15  0366   331          BLEQ    100$                     ;
         FD43 CF42    DF  0368   332          PUSHAL  PCS$DECODED_WORDS[R2]    ;
        00 9E    55  E2  036D   333          BBSS    R5,@(SP)+,100$           ;
        A2 55    03  F3  0371   334 100$:    AOBLEQ  #3,R5,20$                ; br = not finished with message bits
        93 52    54  F2  0375   335          AOBLSS  R4,R2,10$                ; br = not finished with all codewords
                  52  D4  0379   336          CLRL    R2                       ; intialize word counter to do bit 0
            54    0B  D0  037B   337          MOVL    #11,R4                   ; initialize number of words to decode
   50   FDAD CF42    D0  037E   338 110$:    MOVL    PCS$NOISY_WORDS[R2],R0   ; get encoded word
            53    01  D0  0384   339          MOVL    #1,R3                    ; initialize bit counter
   56   FD24 CF42    D0  0387   340 120$:    MOVL    PCS$DECODED_WORDS[R2],R6; get a partially decoded word
  56  56    01    53  EF  038D   341          EXTZV   R3,#1,R6,R6              ; get a decoded bit
   56   FE19 CF43    C4  0392   342          MULL2   PCS$CODEVECTORS[R3],R6   ; get product of vector and decoded bit
            50    56  CC  0398   343          XORL2   R6,R0                    ; get XOR of each product
        E8 53    03  F3  039B   344          AOBLEQ  #3,R3,120$               ; do for all three decoded bits
                  55  D4  039F   345          CLRL    R5                       ; initialize the population counter
                  53  D4  03A1   346          CLRL    R3                       ; initialize the bit counter
        02 50    53  E1  03A3   347 130$:    BBC     R3,R0,140$               ; br = bit is a zero
                  55  D6  03A7   348          INCL    R5                       ; else bump the population counter
        F6 53    0F  F3  03A9   349 140$:    AOBLEQ  #15,R3,130$              ; do for all 16 bits
            08    55  D1  03AD   350          CMPL    R5,#8                    ; make the majority decision
                  09  15  03B0   351          BLEQ    150$                     ; br = majority not ones
         FCF9 CF42    DF  03B2   352          PUSHAL  PCS$DECODED_WORDS[R2]    ; prepare to set LSB
        00 9E    00  E2  03B7   353          BBSS    #0,@(SP)+,150$           ; set LSB in decoded word
        BF 52    54  F2  03BB   354 150$:    AOBLSS  R4,R2,110$               ; br = not finished with all words
            03FF 8F  BA  03BF   355          POPR    #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8,R9>
                      05  03C3   356          RSB                              ; return
                          03C4   357
                          03C4   358
                          03C4   359 ; This routine is used to load a 1K buffer area with test addresses for the
                          03C4   360 ; moving inversions subtest. The different sequence of addresses accessed
                          03C4   361 ; for the current increment are computed and written into the buffer area.
                          03C4   362
                          03C4   363 PCS$SETUP_ADDR:
      57   FC3C CF    D0  03C4   364          MOVL    PCS$L_INC,R7             ; save increment
  58   00000000'EF    D0  03C9   365          MOVL    PCS$A_PCS_BUFFER,R8      ; save address of buffer to store
                          03D0   366                                           ; addresses
      5B   FC44 CF    D0  03D0   367          MOVL    PCS$A_PCS_ADDRESS,R11    ; save first address of pcs
  59  5B   FC2F CF    C1  03D5   368 5$:      ADDL3   PCS$L_ROW,R11,R9         ; add row being tested to address to R9
            88    59  D0  03DB   369 10$:     MOVL    R9,(R8)+                 ; load address to use into buffer
            59    57  C0  03DE   370          ADDL2   R7,R9                    ; add increment to get next address
        F6 59    0E  E1  03E1   371          BBC     #PCS$V_BIT14,R9,10$      ; br = no address overflow yet
            59    57  C2  03E5   372          SUBL2   R7,R9                    ; get last address done
```

```
5A   59   0A   04   EE  03E8          EXTV    #4,#10,R9,R10          ; get address by itself
 5A   FFFFFFFF 8F   D1  03ED          CMPL    #-1,R10                ; check for minus one
                05   13  03F4          BEQL    20$                    ; br = finished building addresses
          5B    10   C0  03F6          ADDL2   #16,R11                ; increment the base address
                DA   11  03F9          BRB     5$                     ; go finish building addresses
                     05  03FB  20$:    RSB                            ; return
                         03FC
                         03FC  ; This subroutine will load PCS with executable micro code.  Three microwords
                         03FC  ; are first loaded into PCS then the value of PCS$L_COUNT is tested to see if
                         03FC  ; it is zero or not.  If PCS$L_COUNT is equal to zero then the test is exited
                         03FC  ; else the number of microwords specified by PCS$L_COUNT is loaded (these
                         03FC  ; microwords are a copy of each other and perform D_D-1,NEXT/<next_pcs_address>
                         03FC  ; where the next_pcs_address is just an incremented address).  The last micro
                         03FC  ; word to be loaded will have a next field of 2800.  Before exiting this
                         03FC  ; routine there will be a test made on the flag bit PCS$V_EXP_CS_PAR.  If this
                         03FC  ; bit is equal to 1 then the first microword in PCS is loaded with bad parity
                         03FC  ; else no bad parity is loaded.
                         03FC  ; For the entry/exit and PCS parity tests a count of zero is used.
                         03FC
                         03FC  PCS$LOAD_MICRO:
          FC1C DF   D4  03FC          CLRL    @PCS$A_ENA_ADDRESS     ; enable loading of PCS
                5A   D4  0400          CLRL    R10                    ; initialize a counter for first two words
     53   FC12 CF   D0  0402          MOVL    PCS$A_PCS_ADDRESS,R3   ; load PCS starting address
     54   FE41 CF   DE  0407          MOVAL   PCS$MICRO_DATA,R4      ; load address of micro code to be loaded
          63   84   D0  040C  1$:     MOVL    (R4)+,(R3)             ; load 20 bits of micro word
          53   04   C0  040F          ADDL2   #4,R3                  ; get next address
       F6 5A   10   F2  0412          AOBLSS  #16,R10,1$             ; br = until first and last words are done
          56   84   7D  0416          MOVQ    (R4)+,R6               ; load first two words in R6 & R7
          58   84   7D  0419          MOVQ    (R4)+,R8               ; load second two words in R8 & R9
          FBE0 CF   D5  041C          TSTL    PCS$L_COUNT            ; check for extra words
                0F   12  0420          BNEQ    3$                     ; br = more than one micro word to load
          83   56   D0  0422          MOVL    R6,(R3)+               ; write first 20 bits
          83   57   D0  0425          MOVL    R7,(R3)+               ; write second 20 bits
          83   58   D0  0428          MOVL    R8,(R3)+               ; write third 20 bits
          83   59   D0  042B          MOVL    R9,(R3)+               ; write fourth 20 bits
             0060   31  042E          BRW     40$                    ; br = finished
          83   84   D0  0431  3$:     MOVL    (R4)+,(R3)+            ; write the first 20 bits
          83   57   D0  0434          MOVL    R7,(R3)+               ; write second 20 bits
          83   58   D0  0437          MOVL    R8,(R3)+               ; write third 20 bits
          83   59   D0  043A          MOVL    R9,(R3)+               ; write fourth 20 bits
                56   D4  043D          CLRL    R6                     ; initialize next address field for
                         043F                                         ; other words
          57   84   7D  043F          MOVQ    (R4)+,R7               ; load constant second 40 bits
          56   84   D0  0442          MOVL    (R4)+,R6               ; setup next address field
                50   7C  0445  5$:     CLRQ    R0                     ; init bit and count to figure high
                         0447                                         ; parity bit
          59   64   D0  0447          MOVL    (R4),R9                ; load last 20 bits, parity bit is
                         044A                                         ; clear
       02 56   50   E1  044A  7$:     BBC     R0,R6,10$              ; br = bit is zero do not count
                51   D6  044E          INCL    R1                     ; bit non zero, count
       F6 50   0C   F2  0450  10$:    AOBLSS  #12,R0,7$              ; br = not finished checking next
                         0454                                         ; address field
       07 51   00   E0  0454          BBS     #0,R1,20$              ; br = Odd number of bits,
                         0458                                         ; do not clear parity bit
 59   00080000 8F   CA  0458          BICL2   #PCS$M_BIT19,R9        ; clear high parity bit
```

```
                52   56   D0  045F   20$:    MOVL    R6,R2                      ; load next address field into R2
        5B   52 08   06   EF  0462           EXTZV   #6,#8,R2,R11               ; get part of next field to invert
                5B   5B   B2  0467           MCOMW   R11,R11                    ; invert the data
        52   08 06   5B   F0  046A           INSV    R11,#6,#8,R2               ; put complete next address field
                             046F                                              ; together
                63   52   D0  046F           MOVL    R2,(R3)                    ; write first 20 bits
             04 A3   57   D0  0472           MOVL    R7,4(R3)                   ; write second 20 bits
             08 A3   58   D0  0476           MOVL    R8,8(R3)                   ; write third 20 bits
             0C A3   59   D0  047A           MOVL    R9,12(R3)                  ; write last 20 bits
                53   10   C0  047E           ADDL2   #16,R3                     ; update address for next word
                     56   D6  0481           INCL    R6                         ; setup next address field
             BD FB79 CF   F5  0483           SOBGTR  PCS$L_COUNT,5$             ; br = load next micro word
                     07   19  0488           BLSS    40$                        ; br = finished
             56   04 A4   D0  048A   30$:    MOVL    4(R4),R6                   ; setup last next address field
                  FFB4    31  048E           BRW     5$                         ; go load it
        0A FB7E CF   05   E0  0491   40$:    BBS     #PCS$V_EXP_CS_PAR,PCS$L_FLAGS,50$
                             0497                                              ; Check to see if we need to load a
                             0497                                              ; parity error word in PCS
   FB78 DF   00100000 8F   C8  0497           BISL2   #PCS$M_BIT20,@PCS$A_PCS_ADDRESS
                             04A0                                              ; Enable PCS
                         05  04A0           RSB                                ; return
             53   FB73 CF   D0  04A1   50$:    MOVL    PCS$A_PCS_ADDRESS,R3       ; load PCS starting address
        0C A3   FE0A CF   D0  04A6           MOVL    PCS$PAR_ERR_WORD,12(R3)    ; load word with inverted P2 bit
   FB63 DF   00100000 8F   C8  04AC           BISL2   #PCS$M_BIT20,@PCS$A_PCS_ADDRESS
                             04B5                                              ; Enable PCS
                         05  04B5           RSB                                ; return
                             04B6
                             04B6
                             04B6   ; This routine is used to service expected and unexpected machine check
                             04B6   ; exceptions. Unexpected machine check exceptions are resignaled and
                             04B6   ; reported by the Supervisor.  This routine will check a flag PCS$M_EXP_CS_PAR
                             04B6   ; to see if there is a CS parity error machine check expected and if yes but
                             04B6   ; the machine check was of a different nature then the stack is stored in a
                             04B6   ; buffer for error logout.  This is performed for the PCS Parity Error test
                             04B6   ; which expected a parity error.
                             04B6
                             04B6
                             04B6   .ALIGN  LONG
                             04B8
                             04B8   PCS$CHECK_MCHK:
             04 AE   01   D1  04B8           CMPL    #1,4(SP)                   ; check for CS parity error
                     1C   13  04BC           BEQL    10$                        ; br = yes parity error
        1F FB51 CF   05   E0  04BE           BBS     #PCS$V_EXP_CS_PAR,PCS$L_FLAGS,20$
                             04C4                                              ; Br = didn't get a cs parity error but
                             04C4                                              ; expected one
                     0E   DD  04C4           PUSHL   #14                        ; put size on stack for printsig
          00660088'EF     DD  04C6           PUSHL   DS$_MCHK                   ; and type
                             04CC           $DS_PRINTSIG_G ARGPTR=(SP)
   00010100 9F   6E     FA  04CC                   CALLG   (SP), @#DS$PRINTSIG
                             04D3           $DS_ABORT
   00010020 9F   6C     FA  04D3                   CALLG   (AP), @#DS$ABORT
                             04DA   ;
                             04DA   ; Come here when there was a CS Parity Error
                             04DA   ;
                5E   8E   C0  04DA   10$:    ADDL2   (SP)+,SP                   ; get over machine check logout
```

```
                6E   FB2B CF    D0   04DD   481          MOVL    PCS$A_RETURN,(SP)       ; set up return address
                                 02   04E2   482          REI                             ; return
                                      04E3   483 ;
                                      04E3   484 ; Come here when we expected a CS Parity Error ( flag PCS$V_EXP_CS_PAR set) but
                                      04E3   485 ; didn't get one.
                                      04E3   486 ;
             51   00000000'EF    D0   04E3   487 20$:     MOVL    A_MCHK_BUFFER,R1        ; Load R1 with address of buffer
                       51   08    C0   04EA   488          ADDL2   #8,R1                   ; Save room for printsig size and type
                            52    D4   04ED   489          CLRL    R2                      ; Init counter
                       81   8E    D0   04EF   490 30$:     MOVL    (SP)+,(R1)+             ; Move stack data to buffer
                     F9 52   0C    F3   04F2   491          AOBLEQ  #12,R2,30$              ; Br = not finished storing stack data
                       5E   08    C2   04F6   492          SUBL2   #8,SP                   ; backup the SP for REI
                6E   FB13 CF    D0   04F9   493          MOVL    PCS$A_RETURN+4,(SP)     ; Set-up the return address
                                 02   04FE   494          REI
                                      04FF   495
```

```
                                        04FF   497
                                        04FF   498 .SBTTL  ERROR MESSAGES
                                        04FF   499
                                        04FF   500 ;-------------------------------------------------------------------------------
                                        04FF   501 PCS$T_CS_PARITY1:
65 20 79 74 69 72 61 70 20 53 43 00'    04FF   502         .ASCIC  "CS parity error occured durring moving inversions."
64 65 72 75 63 63 6F 20 72 6F 72 72     050B
76 6F 6D 20 67 6E 69 72 72 75 64 20     0517
6F 69 73 72 65 76 6E 69 20 67 6E 69     0523
                        2E 73 6E        052F
                              32        04FF
                                        0532   503 ;-------------------------------------------------------------------------------
                                        0532   504 PCS$T_CS_PARITY2:
65 20 79 74 69 72 61 70 20 53 43 00'    0532   505         .ASCIC  "CS parity error occured durring entry/exit."
64 65 72 75 63 63 6F 20 72 6F 72 72     053E
74 6E 65 20 67 6E 69 72 72 75 64 20     054A
           2E 74 69 78 65 2F 79 72      0556
                              2B        0532
                                        055E   506 ;-------------------------------------------------------------------------------
                                        055E   507 PCS$T_CS_PARITY3:
65 20 79 74 69 72 61 70 20 53 43 00'    055E   508         .ASCIC  "CS parity error occured durring next address field."
64 65 72 75 63 63 6F 20 72 6F 72 72     056A
78 65 6E 20 67 6E 69 72 72 75 64 20     0576
69 66 20 73 73 65 72 64 64 61 20 74     0582
                        2E 64 6C 65     058E
                              33        055E
                                        0592   509 ;-------------------------------------------------------------------------------
                                        0592   510 PCS$T_MC_MESS:
20 64 65 74 70 6D 65 74 74 41 20 00'    0592   511         .ASCIC  " Attempted to cause a Machine Check by!/"
4D 20 61 20 65 73 75 61 63 20 6F 74     059E
6B 63 65 68 43 20 65 6E 69 68 63 61     05AA
                        2F 21 79 62 20  05B6
                              28        0592
                                        05BB   512 ;-------------------------------------------------------------------------------
                                        05BB   513 PCS$T_PCS_ERR:
20 67 6E 69 74 75 63 65 78 65 20 00'    05BB   514         .ASCIC  " executing out of PCS with bad parity!/!/"
77 20 53 43 50 20 66 6F 20 74 75 6F     05C7
69 72 61 70 20 64 61 62 20 68 74 69     05D3
                  2F 21 2F 21 79 74     05DF
                              29        05BB
                                        05E5   515 ;-------------------------------------------------------------------------------
                                        05E5   516 PCS$T_MC_ERR:
6D 20 6E 69 20 72 6F 72 72 45 20 00'    05E5   517         .ASCIC  " Error in machine check logout stack!/"-
6B 63 65 68 63 20 65 6E 69 68 63 61     05F1
63 61 74 73 20 74 75 6F 67 6F 6C 20     05FD
21 3A 4C 41 55 54 43 41 20 2F 21 6B     0609
                              2F        0615
                              30        05E5
                                        0616   518                 " ACTUAL:!/"
                                        0616   519 ;-------------------------------------------------------------------------------
                                        0616   520 PCS$T_EXPECTED:
21 3A 44 45 54 43 45 50 58 45 20 00'    0616   521         .ASCIC  " EXPECTED:!/"
                              2F        0622
                              0C        0616
                                        0623   522 ;-------------------------------------------------------------------------------
```

```
                                        0623    523 PCS$T_NO_PCS:
50 20 67 6E 69 74 69 78 45 2F 21 00'    0623    524         .ASCIC  "!/Exiting PCS test, PCS is Not Present.!/"
53 43 50 20 2C 74 73 65 74 20 53 43     062F
73 65 72 50 20 74 6F 4E 20 73 69 20     063B
                  2F 21 2E 74 6E 65     0647
                              29        0623
                                        064D    525 ;-----------------------------------------------------------------------
                                        064D    526 PCS$T_PCS_NORESPOND:
50 20 67 6E 69 74 69 78 45 2F 21 00'    064D    527         .ASCIC  "!/Exiting PCS test, PCS Address F08000(hex) didn't respond.!/"
53 43 50 20 2C 74 73 65 74 20 53 43     0659
38 30 46 20 73 73 65 72 64 64 41 20     0665
64 69 64 20 29 78 65 68 28 30 30 30     0671
2E 64 6E 6F 70 73 65 72 20 74 27 6E     067D
                              2F 21     0689
                                 3D     064D
                                        068B    528 ;-----------------------------------------------------------------------
                                        068B    529 PCS$T_DATAPATH:
65 72 20 61 74 61 64 20 64 61 42 00'    068B    530         .ASCIC  "Bad data recieved checking data path."
6B 63 65 68 63 20 64 65 76 65 69 63     0697
74 61 70 20 61 74 61 64 20 67 6E 69     06A3
                              2E 68     06AF
                                 25     068B
                                        06B1    531 ;-----------------------------------------------------------------------
                                        06B1    532 PCS$T_DPERR:
21 20 3D 20 73 73 65 72 64 64 41 00'    06B1    533         .ASCIC  "Address = !XL  Expected = !XL  Actual = !XL  XOR = !XL!/"
64 65 74 63 65 70 78 45 20 20 4C 58     06BD
75 74 63 41 20 20 4C 58 21 20 3D 20     06C9
4F 58 20 20 4C 58 21 20 3D 20 6C 61     06D5
         2F 21 4C 58 21 20 3D 20 52     06E1
                                 38     06B1
                                        06EA    534 ;-----------------------------------------------------------------------
                                        06EA    535 PCS$T_ROW:
65 72 20 61 74 61 64 20 64 61 42 00'    06EA    536         .ASCIC  "Bad data recieved checking row select."
6B 63 65 68 63 20 64 65 76 65 69 63     06F6
65 6C 65 73 20 77 6F 72 20 67 6E 69     0702
                              2E 74 63  070E
                                 26     06EA
                                        0711    537 ;-----------------------------------------------------------------------
                                        0711    538 PCS$T_ROWERR:
20 20 20 73 73 65 72 64 64 41 20 00'    0711    539         .ASCIC  "  Address     Expected     Actual     XOR!/"
20 20 64 65 74 63 65 70 78 45 20 20     071D
20 20 20 6C 61 75 74 63 41 20 20 20     0729
               2F 21 52 4F 58 20 20     0735
                                 2A     0711
                                        073C    540 ;-----------------------------------------------------------------------
                                        073C    541 PCS$F_ROWERR1:
4C 58 21 20 20 20 20 4C 58 21 20 00'    073C    542         .ASCIC  "  !XL     !XL     !XL    !XL!/"
58 21 20 20 20 4C 58 21 20 20 20 20     0748
                              2F 21 4C  0754
                                 1A     073C
                                        0757    543 ;-----------------------------------------------------------------------
                                        0757    544 PCS$F_ROWERR2:
4C 58 21 20 20 20 20 4C 58 21 20 00'    0757    545         .ASCIC  "  !XL     !XL     !XL!/"
         2F 21 4C 58 21 20 20 20 20     0763
                                 14     0757
```

```
                                        076C   ;-----------------------------------------------------------------------
                                        076C   PCS$T_ADR_ERR:
65 64 20 61 74 61 64 20 64 61 42 00'    076C           .ASCIC  "Bad data decoded while checking address path."
20 65 6C 69 68 77 20 64 65 64 6F 63     0778
64 64 61 20 67 6E 69 6B 63 65 68 63     0784
      2E 68 74 61 70 20 73 73 65 72     0790
                                  2D    076C
                                        079A   ;-----------------------------------------------------------------------
                                        079A   PCS$T_MI_ERR1:
6E 69 20 61 74 61 64 20 64 61 42 00'    079A           .ASCIC  "Bad data in PCS before writing for moving inversions."
20 65 72 6F 66 65 62 20 53 43 50 20     07A6
20 72 6F 66 20 67 6E 69 74 69 72 77     07B2
72 65 76 6E 69 20 67 6E 69 76 6F 6D     07BE
                  2E 73 6E 6F 69 73     07CA
                                  35    079A
                                        07D0   ;-----------------------------------------------------------------------
                                        07D0   PCS$T_MI_ERR2:
6E 69 20 61 74 61 64 20 64 61 42 00'    07D0           .ASCIC  "Bad data in PCS after writing for moving inversions."
77 20 72 65 74 66 61 20 53 43 50 20     07DC
6D 20 72 6F 66 20 67 6E 69 74 69 72     07E8
73 72 65 76 6E 69 20 67 6E 69 76 6F     07F4
                     2E 73 6E 6F 69     0800
                                  34    07D0
                                        0805   ;-----------------------------------------------------------------------
                                        0805   PCS$T_ENTRY_ERR:
6E 69 20 61 74 61 64 20 64 61 42 00'    0805           .ASCIC  "Bad data in R5 executing entry/exit."
6E 69 74 75 63 65 78 65 20 35 52 20     0811
74 69 78 65 2F 79 72 74 6E 65 20 67     081D
                                  2E    0829
                                  24    0805
                                        082A   ;-----------------------------------------------------------------------
                                        082A   PCS$T_NXFIELD_ERR:
6E 69 20 61 74 61 64 20 64 61 42 00'    082A           .ASCIC  "Bad data in R5 while checking PCS NEXT field."
68 63 20 65 6C 69 68 77 20 35 52 20     0836
4E 20 53 43 50 20 67 6E 69 6B 63 65     0842
      2E 64 6C 65 69 66 20 54 58 45     084E
                                  2D    082A
                                        0858   ;-----------------------------------------------------------------------
                                        0858   PCS$F_PCS_ERR:
45 20 2D 20 61 74 61 64 20 35 52 00'    0858           .ASCIC  "R5 data - Expected = !XL  Actual = !XL  XOR = !XL!/"
58 21 20 3D 20 64 65 74 63 65 70 78     0864
20 3D 20 6C 61 75 74 63 41 20 20 4C     0870
21 20 3D 20 52 4F 58 20 20 4C 58 21     087C
                        2F 21 4C 58     0888
                                  33    0858
                                        088C   ;-----------------------------------------------------------------------
                                        088C
                                        088C
```

```
                                 088C   568
                                 088C   569 .SBTTL  ERROR REPORTING ROUTINES
                                 088C   570
                                 088C   571 ;-------------------------------------------------------------------------------
                                 088C   572 PCS$DPERR:
                                 088C   573          $DS_BGNMESSAGE  REGMASK=<R3,R4,R5,R6,R7>
                           00F8  088C                       .WORD   ^M<R3,R4,R5,R6,R7>                ; ENTRY MASK
      57   18 AC    14    00    EF  088E   574          EXTZV   #0,#20,ERR$_P2(AP),R7    ; get expected data
           53   1C AC    57    CD  0894   575          XORL3   R7,ERR$_P3(AP),R3        ; get XOR of data
                                 0899   576          $DS_PRINTB_S    FORMAT=PCS$T_DPERR,P1=ERR$_P1(AP),P2=R7,-
                                 0899   577                          P3=ERR$_P3(AP),P4=R3
                                 0899                       PUSHL   R3
                                 089B                       PUSHL   ERR$_P3(AP)
                                 089E                       PUSHL   R7
                                 08A0                       PUSHL   ERR$_P1(AP)
                                 08A3                       PUSHAB  PCS$T_DPERR
                000100E0 9F      08A7                       CALLS   #$$N, a#DS$PRINTB
                                 08AE   578          $DS_ENDMESSAGE
                                 08AE                       RET                              ; RETURN TO DIAGNOSTIC SUPERVISOR
                                 08AF   579 ;-------------------------------------------------------------------------------
                                 08AF   580 PCS$ROWERR:
                                 08AF   581          $DS_BGNMESSAGE  REGMASK=<R4,R5,R8,R9>
                           0330  08AF                       .WORD   ^M<R4,R5,R8,R9>                  ; ENTRY MASK
                                 08B1   582          $DS_PRINTB_S    FORMAT=PCS$T_ROWERR
                                 08B1                       PUSHAB  PCS$T_ROWERR
                000100E0 9F      08B5                       CALLS   #$$N, a#DS$PRINTB
                                 08BC   583          MOVL    #1,R8                            ; load expected data and counter
           54   F755 CF          08BF   584          MOVL    PCS$A_PCS_ADDRESS,R4     ; load initial PCS address
           55   F768 CF          08C4   585          MOVAL   PCS$A_PCS_BUF,R5         ; load address of buffer
           59   65   58    CD    08C9   586 1$:      XORL3   R8,(R5),R9               ; generate XOR of data
                     15    13    08CD   587          BEQL    2$                       ; skip basic message if data is good
                                 08CF   588          $DS_PRINTB_S    FORMAT=PCS$F_ROWERR1,P1=R4,P2=R8,P3=(R5),P4=R9
                                 08CF                       PUSHL   R9
                                 08D1                       PUSHL   (R5)
                                 08D3                       PUSHL   R8
                                 08D5                       PUSHL   R4
                                 08D7                       PUSHAB  PCS$F_ROWERR1
                000100E0 9F      08DB                       CALLS   #$$N, a#DS$PRINTB
                     11    11    08E2   589          BRB     3$                               ; skip extended message
                                 08E4   590 2$:      $DS_PRINTX_S    FORMAT=PCS$F_ROWERR2,P1=R4,P2=R8,P3=(R5)
                                 08E4                       PUSHL   (R5)
                                 08E6                       PUSHL   R8
                                 08E8                       PUSHL   R4
                                 08EA                       PUSHAB  PCS$F_ROWERR2
                000100E8 9F      08EE                       CALLS   #$$N, a#DS$PRINTX
                     85   D5    08F5   591 3$:      TSTL    (R5)+                            ; update R5
           54        04   C0    08F7   592          ADDL2   #4,R4                            ; update R4
      CB   58        04   F3    08FA   593          AOBLEQ  #4,R8,1$                         ; br = not finished
                                 08FE   594          $DS_ENDMESSAGE
                                 08FE                       RET                              ; RETURN TO DIAGNOSTIC SUPERVISOR
                                 08FF   595 ;-------------------------------------------------------------------------------
                                 08FF   596 PCS$ADDR_ERR:
                                 08FF   597          $DS_BGNMESSAGE  REGMASK=<R4,R5,R6,R7,R8,R9>
                           03F0  08FF                       .WORD   ^M<R4,R5,R6,R7,R8,R9>            ; ENTRY MASK
                                 0901   598          $DS_PRINTB_S    FORMAT=PCS$T_ROWERR
```

```
                FE0C CF    9F   0901                        PUSHAB  PCS$T_ROWERR
        000100E0 9F    01   FB   0905                        CALLS   #$$N, a#DS$PRINTB
                       57   D4   090C   599          CLRL    R7                      ; load expected data and counter
              54   14 AC   D0   090E   600          MOVL    ERR$_P1(AP),R4          ; load first address of row selected
                   53   08   D0   0912   601          MOVL    #8,R3                   ; initialize floating address
              55   F797 CF   DE   0915   602          MOVAL   PCS$DECODED_WORDS,R5    ; load address of actual data
              56   54   53   C1   091A   603 1$:      ADDL3   R3,R4,R6                ; build address
              59   65   57   CD   091E   604          XORL3   R7,(R5),R9              ; generate XOR of data
                   15   13   0922   605          BEQL    2$                      ; skip basic message if data is good
                             0924   606          $DS_PRINTB_S    FORMAT=PCS$F_ROWERR1,P1=R6,P2=R7,P3=(R5),P4=R9
                        59   DD   0924                        PUSHL   R9
                        65   DD   0926                        PUSHL   (R5)
                        57   DD   0928                        PUSHL   R7
                        56   DD   092A                        PUSHL   R6
                FE0C CF    9F   092C                        PUSHAB  PCS$F_ROWERR1
        000100E0 9F    05   FB   0930                        CALLS   #$$N, a#DS$PRINTB
                       11   11   0937   607          BRB     3$                      ; skip extended message
                             0939   608 2$:      $DS_PRINTX_S    FORMAT=PCS$F_ROWERR2,P1=R6,P2=R7,P3=(R5)
                        65   DD   0939                        PUSHL   (R5)
                        57   DD   093B                        PUSHL   R7
                        56   DD   093D                        PUSHL   R6
                FE14 CF    9F   093F                        PUSHAB  PCS$F_ROWERR2
        000100E8 9F    04   FB   0943                        CALLS   #$$N, a#DS$PRINTX
                       85   D5   094A   609 3$:      TSTL    (R5)+                   ; update R5
              53   53   01   9C   094C   610          ROTL    #1,R3,R3                ; float one across address
                C6 57   0A   F3   0950   611          AOBLEQ  #10,R7,1$               ; br = not finished
                             0954   612          $DS_ENDMESSAGE
                        04   0954                        RET                     ; RETURN TO DIAGNOSTIC SUPERVISOR
                             0955   613 ;-------------------------------------------------------------------------------
                             0955   614 PCS$MI_ERR:
                             0955   615          $DS_BGNMESSAGE  REGMASK=<R3,R4,R5,R6>
                        0078 0955                        .WORD   ^M<R3,R4,R5,R6>         ; ENTRY MASK
                  54   14 AC   D0   0957   616          MOVL    ERR$_P1(AP),R4          ; get address of error
                  55   18 AC   D0   095B   617          MOVL    ERR$_P2(AP),R5          ; get expected data
                  53   1C AC   D0   095F   618          MOVL    ERR$_P3(AP),R3          ; get actual data
              56   53   55   CD   0963   619          XORL3   R5,R3,R6                ; get XOR of data
                             0967   620          $DS_PRINTB_S    FORMAT=PCS$T_DPERR,P1=R4,P2=R5,P3=R3,P4=R6
                        56   DD   0967                        PUSHL   R6
                        53   DD   0969                        PUSHL   R3
                        55   DD   096B                        PUSHL   R5
                        54   DD   096D                        PUSHL   R4
                FD3E CF    9F   096F                        PUSHAB  PCS$T_DPERR
        000100E0 9F    05   FB   0973                        CALLS   #$$N, a#DS$PRINTB
                             097A   621          $DS_ENDMESSAGE
                        04   097A                        RET                     ; RETURN TO DIAGNOSTIC SUPERVISOR
                             097B   622 ;-------------------------------------------------------------------------------
                             097B   623 PCS$PCS_ERR:
                             097B   624          $DS_BGNMESSAGE  REGMASK=<R3,R4,R5>
                        0038 097B                        .WORD   ^M<R3,R4,R5>            ; ENTRY MASK
                   53   0F   D0   097D   625          MOVL    #15,R3                  ; get expected data
              54   55   53   CD   0980   626          XORL3   R3,R5,R4                ; get XOR of data
                             0984   627          $DS_PRINTB_S    FORMAT=PCS$F_PCS_ERR,P1=R3,P2=R5,P3=R4
                        54   DD   0984                        PUSHL   R4
                        55   DD   0986                        PUSHL   R5
                        53   DD   0988                        PUSHL   R3
```

```
                FECA CF    9F   098A                        PUSHAB  PCS$F_PCS_ERR
        000100E0 9F    04   FB   098E                        CALLS   #$$N, a#DS$PRINTB
                                 0995   628          $DS_ENDMESSAGE
                           04    0995                        RET                         ; RETURN TO DIAGNOSTIC SUPERVISOR
                                 0996   629 ;-------------------------------------------------------------------------------
                                 0996   630 PCS$NO_PARERR_MSG:
                                 0996   631          $DS_BGNMESSAGE  REGMASK=<R2,R7> ; Save R2 and R7
                           0084  0996                        .WORD   ^M<R2,R7>                   ; ENTRY MASK
                                 0998   632          $DS_PRINTB_S    FORMAT=PCS$T_MC_MESS
                FBF6 CF    9F   0998                        PUSHAB  PCS$T_MC_MESS
        000100E0 9F    01   FB   099C                        CALLS   #$$N, a#DS$PRINTB
                                 09A3   633          $DS_PRINTB_S    FORMAT=@ERR$_P1(AP)
                  14 BC    9F   09A3                        PUSHAB  @ERR$_P1(AP)
        000100E0 9F    01   FB   09A6                        CALLS   #$$N, a#DS$PRINTB
                                 09AD   634          $DS_PRINTB_S    FORMAT=PCS$T_MC_ERR
                FC34 CF    9F   09AD                        PUSHAB  PCS$T_MC_ERR
        000100E0 9F    01   FB   09B1                        CALLS   #$$N, a#DS$PRINTB
        57   00000000'EF    D0   09B8   635          MOVL    A_MCHK_BUFFER,R7            ; load address of actual data
            67   F84D CF    7D   09BF   636          MOVQ    PCS$TABLE1,(R7)             ; load size and type
                                 09C4   637          $DS_PRINTSIG_G  ARGPTR=(R7)
        00010100 9F    67   FA   09C4                        CALLG   (R7), a#DS$PRINTSIG
                                 09CB   638          $DS_PRINTB_S    FORMAT=PCS$T_EXPECTED
                FC47 CF    9F   09CB                        PUSHAB  PCS$T_EXPECTED
        000100E0 9F    01   FB   09CF                        CALLS   #$$N, a#DS$PRINTB
                                 09D6   639          $DS_PRINTSIG_G  ARGPTR=@ERR$_P2(AP)
      00010100 9F    18 BC    FA   09D6                        CALLG   @ERR$_P2(AP), a#DS$PRINTSIG
                                 09DE   640          $DS_ENDMESSAGE
                           04    09DE                        RET                         ; RETURN TO DIAGNOSTIC SUPERVISOR
                                 09DF   641 ;-------------------------------------------------------------------------------
                                 09DF   642
                                 09DF   643          $DS_PAGE
```

```
                        09DF                    .SBTTL  TEST 13:  PCS Memory Test
                    00000000                    .PSECT  TEST_013, PAGE, NOWRT
                        0014
                        0014    646 ;++
                        0014    647 ; Test description:
                        0014    648 ;
                        0014    649 ;       This test checks the PCS as a parity memory with standard memory tests.
                        0014    650 ;       These tests include floating ones and zeros on the data path, testing
                        0014    651 ;       group select logic , floating ones and zeros on the address lines and
                        0014    652 ;       testing the RAMs using the moving inversions algorithm.
                        0014    653 ;
                        0014    654 ;
                        0014    655 ;--
                        0014    656
                        0014    657         $DS_BGNTEST     <PCS,DEFAULT,ALL>
                        0014        DATA_013:
                    00000000    0014                .LONG   0                   ; TEST ARGUMENT TABLE TERMINATOR
                        0018        TEST_013::
                        0000    0018                .WORD   ^M<>                ; ENTRY MASK
          54    00000000'8F     DB  001A    658         MFPR    #PR$_SID,R4         ; get system id register
       55   54    08    08     EF  0021    659         EXTZV   #8,#8,R4,R5         ; extract the micro code revision level
        00000000'EF    55     D1  0026    660         CMPL    R5,L_REV_CHECK      ; check the revision level
                       45     1A  002D    661         BGTRU   5$                  ; br = this is a L0008 module
        0000FE54'EF    01     D1  002F    662         CMPL    #1,DSA$GL_PASSNO    ; ckeck for first pass
                       03     13  0036    663         BEQLU   1$                  ; br = first pass
                     0020     31  0038    664         BRW     2$                  ; Not first pass, skip to 2$
    0000FE00'EF    80000000 8F   D3  003B    665 1$:     BITL    #DSA$M_APT,DSA$GL_FLAGS ; Check to see if APT is present
                       19     13  0046    666         BEQLU   3$                  ; Branch = No APT
                              0048    667         $DS_ERRHARD_S   UNIT=#0,MSGADR=PCS$T_NO_PCS
                       00     DD  0048                PUSHL   #0
                00000623'EF   DF  004A                PUSHAL  PCS$T_NO_PCS
                       00     DD  0050                PUSHL   #0
                       01     DD  0052                PUSHL   #$ER
                              0054        ;;; TEST 13, SUBTEST 0, ERROR 1
          000100D0 9F    04   FB  0054                CALLS   #$$M, a#DS$ERRHARD
                              005B    668                                     ; ERRHARD is for APT, NO L0008 module
                              005B    669 2$:     $DS_EXIT        TEST
                 50    01     D0  005B                MOVL    #1,R0               ; NOT AN ERROR
                    03C4     31  005E                BRW     TEST_013_X          ; EXIT TEST 13
                              0061    670 3$:     $DS_PRINTF_S    FORMAT=PCS$T_NO_PCS
                00000623'EF   9F  0061                PUSHAB  PCS$T_NO_PCS
          000100F0 9F    01   FB  0067                CALLS   #$$N, a#DS$PRINTF
                              006E    671         $DS_EXIT        TEST                ; not L0008 module, exit the test
                 50    01     D0  006E                MOVL    #1,R0               ; NOT AN ERROR
                    03B1     31  0071                BRW     TEST_013_X          ; EXIT TEST 13
          54    00000018'EF   D0  0074    672 5$:     MOVL    PCS$A_PCS_ADDRESS,R4
                              007B    673         $DS_PROBE_S     ADDRESS=(R4),LENGTH=#4,UNIT=#0
                       00     DD  007B                PUSHL   #0
                       04     DD  007D                PUSHL   #4
                       64     9F  007F                PUSHAB  (R4)
          000101A0 9F    03   FB  0081                CALLS   #3, a#DS$PROBE
                    42 50     E8  0088    674         BLBS    R0,15$              ; br = address responded
          0000FE54'EF    01   D1  008B    675         CMPL    #1,DSA$GL_PASSNO    ; ckeck for first pass
                       33     12  0092    676         BNEQ    10$                 ; br = not first pass
    0000FE00'EF    80000000 8F   D3  0094    677         BITL    #DSA$M_APT,DSA$GL_FLAGS ; Check to see if APT is present
```

```
                     19   13   009F    678          BEQLU   8$                          ; Branch = No APT
                          00A1    679          $DS_ERRHARD_S   UNIT=#0,MSGADR=PCS$T_PCS_NORESPOND
                     00   DD   00A1                   PUSHL   #0
          0000064D'EF     DF   00A3                   PUSHAL  PCS$T_PCS_NORESPOND
                     00   DD   00A9                   PUSHL   #0
                     02   DD   00AB                   PUSHL   #$ER
                          00AD        ;;; TEST 13, SUBTEST 0, ERROR 2
      000100D0 9F    04   FB   00AD                   CALLS   #$$M, a#DS$ERRHARD
                          00B4    680                                  ; ERRHARD is for APT, No response
                          00B4    681                                  ; from the PCS module
                          00B4    682          $DS_EXIT        TEST
               50    01   D0   00B4                   MOVL    #1,R0               ; NOT AN ERROR
                  036B   31   00B7                   BRW     TEST_013_X          ; EXIT TEST 13
                          00BA    683 8$:      $DS_PRINTF_S    FORMAT=PCS$T_PCS_NORESPOND
          0000064D'EF     9F   00BA                   PUSHAB  PCS$T_PCS_NORESPOND
      000100F0 9F    01   FB   00C0                   CALLS   #$$N, a#DS$PRINTF
                          00C7    684 10$:     $DS_EXIT        TEST
               50    01   D0   00C7                   MOVL    #1,R0               ; NOT AN ERROR
                  0358   31   00CA                   BRW     TEST_013_X          ; EXIT TEST 13
                          00CD    685 ;15$:    MTPR    #1,#PR$_CADR                ; disable cache  5.2
               25    00   DA   00CD    686 15$:     MTPR    #0,#PR750$_CADR             ; disable cache
                          00D0    687          $DS_CKLOOP      1$
    00010040 9F    FF67 CF   FA   00D0                   CALLG   1$, a#DS$CKLOOP
                          00D9    688
          000002CE'EF     16   00D9    689          JSB     PCS$CLEAR_PCS               ; initialize PCS
                          00DF    690          $DS_PAGE
```

```
                                00DF                    .SBTTL  SUBTEST 13.1:  Data Path
                                00DF    693 ;+
                                00DF    694 ; Subtest description:
                                00DF    695 ;
                                00DF    696 ;       The 11/750 micro word is 80 bits wide. When the PCS is addressed as a
                                00DF    697 ;       memory, the 80 bit micro word is divided into four 1K by 20 bit rows
                                00DF    698 ;       of words. This subtest checks the data path for stuck at one, stuck at
                                00DF    699 ;       zero, and shorted data lines. This is accomplished by floating a one
                                00DF    700 ;       and a zero through the data path for each 20 bit row of RAMs. If an
                                00DF    701 ;       error is detected it is reported with information describing the nature
                                00DF    702 ;       of the error. Any errors detected in this subtest must be corrected
                                00DF    703 ;       befor going on to the next subtest.
                                00DF    704 ;
                                00DF    705 ;
                                00DF    706 ; Subtest steps:
                                00DF    707 ;
                                00DF    708 ;       BGNSUBTEST Data Path
                                00DF    709 ;       :  Initialize flags
                                00DF    710 ;       :  Enable writing of PCS
                                00DF    711 ;       :  Initialize data pattern
                                00DF    712 ;       :  REPEAT
                                00DF    713 ;       :  :  REPEAT
                                00DF    714 ;       :  :  :  Write pattern
                                00DF    715 ;       :  :  :  Read pattern
                                00DF    716 ;       :  :  :  IF pattern incorrect
                                00DF    717 ;       :  :  :  THEN
                                00DF    718 ;       :  :  :  :  Report error
                                00DF    719 ;       :  :  :  ENDIF
                                00DF    720 ;       :  :  :  Update pattern
                                00DF    721 ;       :  :  : UNTIL all patterns done
                                00DF    722 ;       :  :  ENDREPEAT
                                00DF    723 ;       :  : UNTIL all rows done
                                00DF    724 ;       :  ENDREPEAT
                                00DF    725 ;       ENDSUBTEST Data Path
                                00DF    726 ;
                                00DF    727 ;
                                00DF    728 ; Errors:
                                00DF    729 ;
                                00DF    730 ;
                                00DF    731 ;       If an error occurs, it can be helpful to allow the program to
                                00DF    732 ;       continue running to collect data from other failures wthin this subtest
                                00DF    733 ;       to determine the type of failure that is occuring. An example of this
                                00DF    734 ;       would be to collect a set of error reports which indicate the same bit
                                00DF    735 ;       error for all four rows. This might indicate that the error is in the
                                00DF    736 ;       data path and not an individual RAM error.
                                00DF    737 ;
                                00DF    738 ;
                                00DF    739 ;-
                                00DF    740
                                00DF    741
                                00DF    742             $DS_BGNSUB
                                00DF            T13_S1::
00010030 9F   00000000'EF   FA   00DF                        CALLG   $S$, a#DS$BGNSUB
         00000014'EF   D4   00EA    743             CLRL    PCS$L_FLAGS             ; initialize flags
      54 00000018'EF   D0   00F0    744             MOVL    PCS$A_PCS_ADDRESS,R4    ; load first PCS address
```

```
                0000001C'FF    D4   00F7    745          CLRL    @PCS$A_ENA_ADDRESS      ; Enable the writing of PCS
                          58   D4   00FD    746          CLRL    R8                      ; initialize row counter
             55   00000028'EF   D0   00FF    747 1$:      MOVL    PCS$DATA_PATTERN,R5     ; load all zeros pattern
                          57   D4   0106    748 2$:      CLRL    R7                      ; initialize bit counter
               55    55    FF 8F   9C   0108    749 3$:      ROTL    #-1,R5,R5               ; float pattern across data
          53   55    14    00   EF   010D    750 4$:      EXTZV   #0,#20,R5,R3            ; extract the data to be written
                     64    53   D0   0112    751          MOVL    R3,(R4)                 ; write data
                     56    64   D0   0115    752          MOVL    (R4),R6                 ; read data
          56   56    14    00   EF   0118    753          EXTZV   #0,#20,R6,R6            ; extract the data read
                     56    53   D1   011D    754          CMPL    R3,R6                   ; compare data
                     25    13   0120    755          BEQL    5$                      ; br = data good
                           0122    756          $DS_ERRHARD_S   UNIT=#0,MSGADR=PCS$T_DATAPATH,PRLINK=PCS$DPERR,-
                           0122    757                          P1=R4,P2=R3,P3=R6
                     56    DD   0122                    PUSHL   R6
                     53    DD   0124                    PUSHL   R3
                     54    DD   0126                    PUSHL   R4
                0000088C'EF    DF   0128                    PUSHAL  PCS$DPERR
                0000068B'EF    DF   012E                    PUSHAL  PCS$T_DATAPATH
                     00    DD   0134                    PUSHL   #0
                     01    DD   0136                    PUSHL   #$ER
                           0138        ;;; TEST 13, SUBTEST 1, ERROR 1
             000100D0 9F    07   FB   0138                    CALLS   #$$M, a#DS$ERRHARD
                           013F    758          $DS_CKLOOP      4$                      ; set loop for write and read
          00010040 9F    CB AF   FA   013F                    CALLG   4$, a#DS$CKLOOP
                           0147    759 ;5$:     AOBLEQ  #19,R7,3$               ; br = not done floating data 5.2
                     BD 57    14   F3   0147    760 5$:      AOBLEQ  #20,R7,3$               ; br = not done floating data
                           014B    761
        10 00000014'EF    00   E0   014B    762          BBS     #PCS$V_PAT,PCS$L_FLAGS,6$
                           0153    763                                                  ; br = both data patterns done
             55   0000002C'EF    D0   0153    764          MOVL    PCS$DATA_PATTERN+4,R5   ; point R5 to second pattern
             00000014'EF    01   88   015A    765          BISB2   #PCS$M_PAT,PCS$L_FLAGS  ; set data pattern done flag
                          A3   11   0161    766          BRB     2$                      ; go write second pattern
                     54    04   C0   0163    767 6$:      ADDL2   #4,R4                   ; select next row
             00000014'EF    01   CA   0166    768          BICL2   #PCS$M_PAT,PCS$L_FLAGS  ; clear data pattern done flag
                  8E 58    03   F3   016D    769          AOBLEQ  #3,R8,1$                ; br = not done for all rows
                000002CE'EF    16   0171    770          JSB     PCS$CLEAR_PCS           ; initialize PCS
                           0177    771          $DS_ENDSUB
                           0177        T13_S1_X:
        00010038 9F    00000000'EF    FA   0177                    CALLG   $S$, a#DS$ENDSUB
                           0182    772
                           0182    773          $DS_PAGE
```

```
                                0182                .SBTTL  SUBTEST 13.2:  Row Select
                                0182   776 ;+
                                0182   777 ; Subtest description:
                                0182   778 ;
                                0182   779 ;       This subtest checks row select (bits 2 and 3 of the address). The PCS
                                0182   780 ;       is addressed as four 1K by 20 bit rows of words. A unique pattern is
                                0182   781 ;       written to each row, using the addresses that were tested and verrified
                                0182   782 ;       in the data path subtest. Then each location is read back to see if the
                                0182   783 ;       pattern is correct. If one of the row select lines are stuck one, stuck
                                0182   784 ;       zero or shorted together, the data will be over written in at least one
                                0182   785 ;       of the four rows. This subtest is dependant on the successful
                                0182   786 ;       completion of the data path subtest.
                                0182   787 ;
                                0182   788 ;
                                0182   789 ; Subtest steps:
                                0182   790 ;
                                0182   791 ;       BNGSUBTEST Row Select
                                0182   792 ;       :  Enable writing of PCS
                                0182   793 ;       :  Write data patterns
                                0182   794 ;       :  Read data patterns
                                0182   795 ;       :  IF data patterns are incorrect
                                0182   796 ;       :  :  THEN
                                0182   797 ;       :  :  Report error
                                0182   798 ;       :  ENDIF
                                0182   799 ;       ENDSUBTEST Row Select
                                0182   800 ;
                                0182   801 ;
                                0182   802 ; Errors:
                                0182   803 ;
                                0182   804 ;
                                0182   805 ;       When an error is reported, the contents of the four addresses written
                                0182   806 ;       and read will be displayed. An example of an error could be the low
                                0182   807 ;       order bit of the row select is stuck zero. This means that instead of
                                0182   808 ;       selecting row 0, 1, 2, and 3 (each written with a unique pattern), row
                                0182   809 ;       0, 1, 0, 1 will be selected. When the data is read back row 0 will have
                                0182   810 ;       pattern 3, row 1 will have pattern 4, and rows 3 and 4 will have
                                0182   811 ;       correct data. After an error has been corrected in this subtest,
                                0182   812 ;       testing must must continue with the data path subtest.
                                0182   813 ;
                                0182   814 ;-
                                0182   815         $DS_BGNSUB
                                0182       T13_S2::
00010030 9F   0000000C'EF   FA  0182                   CALLG   $S$, a#DS$BGNSUB
              00000014'EF   D4  018D   816         CLRL    PCS$L_FLAGS              ; initialize flags
              000002B8'EF   16  0193   817         JSB     PCS$CLEAR_BUFFER         ; zero buffer areas
              00000018'FF   D4  0199   818         CLRL    @PCS$A_PCS_ADDRESS       ; Enable the writing of PCS
         54   00000018'EF   D0  019F   819         MOVL    PCS$A_PCS_ADDRESS,R4     ; load first test address
                  58   01   D0  01A6   820         MOVL    #1,R8                    ; initialize row counter
                  64   58   D0  01A9   821 1$:     MOVL    R8,(R4)                  ; write data
                  54   04   C0  01AC   822         ADDL2   #4,R4                    ; update address for next row
               F6 58   04   F3  01AF   823         AOBLEQ  #4,R8,1$                 ; br = not all rows done
         54   00000018'EF   D0  01B3   824         MOVL    PCS$A_PCS_ADDRESS,R4     ; load first address to read
                  58   01   D0  01BA   825         MOVL    #1,R8                    ; initialize row counter
         55   00000030'EF   DE  01BD   826         MOVAL   PCS$A_PCS_BUF,R5         ; load address of buffer for data
                  53   64   D0  01C4   827 2$:     MOVL    (R4),R3                  ; read data
```

```
                53   53    14    00    EF  01C7   828          EXTZV   #0,#20,R3,R3                    ; extract data from word written
                           85    53    D0  01CC   829          MOVL    R3,(R5)+                        ; put data into buffer
                           54    04    C0  01CF   830          ADDL2   #4,R4                           ; update address for next row
                        EE 58    04    F3  01D2   831          AOBLEQ  #4,R8,2$                        ; br = not all rows done
                           58    01    D0  01D6   832          MOVL    #1,R8                           ; initialize data and row counter
                55   00000030'EF    DE  01D9   833          MOVAL   PCS$A_PCS_BUF,R5                ; load address of buffer
                           58    85    D1  01E0   834 3$:      CMPL    (R5)+,R8                        ; check data
                                 07    13  01E3   835          BEQL    4$                              ; br = no data error
                00000014'EF      04    C8  01E5   836          BISL2   #PCS$M_ROW_ERR,PCS$L_FLAGS
                                       01EC   837                                                  ; set error flag
                           F0 58    04    F3  01EC   838 4$:      AOBLEQ  #4,R8,3$                        ; br = not all rows done
             17 00000014'EF      02    E1  01F0   839          BBC     #PCS$V_ROW_ERR,PCS$L_FLAGS,5$
                                       01F8   840                                                  ; br = no error
                                       01F8   841          $DS_ERRHARD_S   UNIT=#0,MSGADR=PCS$T_ROW,PRLINK=PCS$ROWERR
                      000008AF'EF      DF  01F8                        PUSHAL  PCS$ROWERR
                      000006EA'EF      DF  01FE                        PUSHAL  PCS$T_ROW
                                 00    DD  0204                        PUSHL   #0
                                 01    DD  0206                        PUSHL   #$ER
                                       0208       ;;; TEST 13, SUBTEST 2, ERROR 1
                000100D0 9F      04    FB  0208                        CALLS   #$$M, a#DS$ERRHARD
                                       020F   842 5$:
                      000002CE'EF      16  020F   843          JSB     PCS$CLEAR_PCS                   ; initialize PCS
                                       0215   844          $DS_ENDSUB
                                       0215       T13_S2_X:
    00010038 9F      0000000C'EF      FA  0215                        CALLG   $S$, a#DS$ENDSUB
                                       0220   845
                                       0220   846          $DS_PAGE
```

```
                        0220                    .SBTTL  SUBTEST 13.3:  Address Path
                        0220    849 ;+
                        0220    850 ; Subtest description:
                        0220    851 ;
                        0220    852 ;       This subtest checks the address path for bits stuck at one, stuck at
                        0220    853 ;       zero and shorted together. The PCS has a ten bit address path which
                        0220    854 ;       runs in parallel with all of the rams in all four rows. Each row is
                        0220    855 ;       tested seperatly by writing an encoded incremental pattern to a set of
                        0220    856 ;       addresses, reading the data back, decoding it and checking
                        0220    857 ;       for errors. The code used is the Reed - Muller (32,6) code which allows
                        0220    858 ;       for up to six RAM failures befor detecting an error. This method aides
                        0220    859 ;       in distingushing RAM errors from address path errors. Floating a one
                        0220    860 ;       across the address path makes up the set of addresses used in this
                        0220    861 ;       subtest.
                        0220    862 ;
                        0220    863 ;
                        0220    864 ; Subtest steps:
                        0220    865 ;
                        0220    866 ;       BGNSUBTEST Address Path
                        0220    867 ;       :  Initialize flags
                        0220    868 ;       :  Enable writing of PCS
                        0220    869 ;       :  REPEAT
                        0220    870 ;       :  :  Write encoded data to all addresses
                        0220    871 ;       :  :  Read encoded data from all addresses
                        0220    872 ;       :  :  Decode data
                        0220    873 ;       :  :  Check data
                        0220    874 ;       :  :  IF any data errors
                        0220    875 ;       :  :  :  THEN
                        0220    876 ;       :  :  :  Report data path error
                        0220    877 ;       :  :  ENDIF
                        0220    878 ;       :  : UNTIL all four rows done
                        0220    879 ;       :  ENDREPEAT
                        0220    880 ;       ENDSUBTEST Address Path
                        0220    881 ;
                        0220    882 ;
                        0220    883 ;-
                        0220    884
                        0220    885
                        0220    886             $DS_BGNSUB
                        0220            T13_S3::
00010030 9F   00000018'EF   FA  0220                    CALLG   $S$, a#DS$BGNSUB
              00000014'EF   D4  022B    887           CLRL    PCS$L_FLAGS                 ; init flags
                    54      D4  0231    888           CLRL    R4                          ; initialize row counter
              0000001C'FF   D4  0233    889           CLRL    aPCS$A_ENA_ADDRESS          ; Enable writing of PCS
         58   00000018'EF   D0  0239    890           MOVL    PCS$A_PCS_ADDRESS,R8        ; load first PCS address
              55    58      D0  0240    891 1$:       MOVL    R8,R5                       ; load it in R5 too
              53    08      D0  0243    892           MOVL    #8,R3                       ; initialize floating address
         56   000001C0'EF   DE  0246    893           MOVAL   PCS$CODE_WORDS,R6           ; load address of encoded data
         57   00000130'EF   DE  024D    894           MOVAL   PCS$NOISY_WORDS,R7          ; load address of data buffer
              65    86      D0  0254    895 2$:       MOVL    (R6)+,(R5)                  ; write test data
              87    65      D0  0257    896           MOVL    (R5),(R7)+                  ; read test data
         53   53    01      9C  025A    897           ROTL    #1,R3,R3                    ; float one across address
         55   58    53      C1  025E    898           ADDL3   R3,R8,R5                    ; build next test address
           EE 53    0E      E1  0262    899           BBC     #PCS$V_BIT14,R3,2$          ; br = not finished
              00000303'EF   16  0266    900           JSB     PCS$RM_DECODE               ; go decode test data
```

```
                    59   D4  026C   901          CLRL    R9                          ; init counter
        5A   000000B0'EF  DE  026E   902          MOVAL   PCS$DECODED_WORDS,R10       ; load address of decoded words
                  8A  59  D1  0275   903 3$:     CMPL    R9,(R10)+                   ; check data
                    07   13  0278   904          BEQL    4$                          ; br = no error
        00000014'EF  02   C8  027A   905          BISL2   #PCS$M_DATA_ERR,PCS$L_FLAGS
                              0281   906                                              ; set error flag
              F0 59  0A   F3  0281   907 4$:     AOBLEQ  #10,R9,3$                   ; br = not finished checking data
     19 00000014'EF  01   E1  0285   908          BBC     #PCS$V_DATA_ERR,PCS$L_FLAGS,5$
                              028D   909                                              ; br = no error
                              028D   910          $DS_ERRHARD_S   UNIT=#0,MSGADR=PCS$T_ADR_ERR,PRLINK=PCS$ADDR_ERR,P1=R8
                    58   DD  028D                        PUSHL   R8
             000008FF'EF  DF  028F                        PUSHAL  PCS$ADDR_ERR
             0000076C'EF  DF  0295                        PUSHAL  PCS$T_ADR_ERR
                    00   DD  029B                        PUSHL   #0
                    01   DD  029D                        PUSHL   #$ER
                              029F       ;;; TEST 13, SUBTEST 3, ERROR 1
        000100D0 9F  05   FB  029F                        CALLS   #$$M, @#DS$ERRHARD
                  58  04   C0  02A6   911 5$:     ADDL2   #4,R8                       ; update row select
              93 54  03   F3  02A9   912          AOBLEQ  #3,R4,1$                    ; br = not all rows done
             000002CE'EF  16  02AD   913          JSB     PCS$CLEAR_PCS               ; initialize PCS
                              02B3   914
                              02B3   915          $DS_ENDSUB
                              02B3       T13_S3_X:
  00010038 9F   00000018'EF  FA  02B3                        CALLG   $S$, @#DS$ENDSUB
                              02BE   916
                              02BE   917          $DS_PAGE
```

```
                        .SBTTL  SUBTEST 13.4:  Moving Inversions
                ;+
                ; Subtest description:
                ;
                ;       This subtest does an exhaustive test of all RAM chips using the
                ;       moving inversions algorithem. Each address accessed in this subtest
                ;       will be read, written and then read again with data which is checked
                ;       after each read. This subtest starts at the first address and works
                ;       its way up thru PCS memory, eventually writing all locations with all
                ;       ones. Then the process is started again and is complete when all
                ;       locations have been written with all zeros. Next this is done working
                ;       from the last address to the first, both writting till the data is all
                ;       ones and then all zeros. This is done for all bit positions in all RAMS
                ;       (four bits). For each successive pass a different address bit is used
                ;       as the lease signifigant bit in counting such that every address line
                ;       is toggled at the fastest possible rate.
                ;
                ; Subtest steps:
                ;
                ;       BGNSUBTEST Moving Inversions
                ;       : REPEAT
                ;       : : Set increment to 1
                ;       : : REPEAT
                ;       : : : Initialize flags
                ;       : : : Point to first entry in data table
                ;       : : : Set forward direction
                ;       : : : REPEAT
                ;       : : : : REPEAT
                ;       : : : : : Set address to starting address
                ;       : : : : : REPEAT
                ;       : : : : : : Read data
                ;       : : : : : : IF data error
                ;       : : : : : : : THEN
                ;       : : : : : : : Report data error
                ;       : : : : : : ENDIF
                ;       : : : : : : Write data
                ;       : : : : : : Read data
                ;       : : : : : : IF data error
                ;       : : : : : : : THEN
                ;       : : : : : : : Report data error
                ;       : : : : : : ENDIF
                ;       : : : : : : Update address
                ;       : : : : : : UNTIL all addresses done
                ;       : : : : : ENDREPEAT
                ;       : : : : : Update data
                ;       : : : : : UNTIL all data done
                ;       : : : : ENDREPEAT
                ;       : : : : Change direction
                ;       : : : : UNTIL reverse is done
                ;       : : : ENDREPEAT
                ;       : : : Update row
                ;       : : : UNTIL all rows done
                ;       : : ENDREPEAT
                ;       : : Update increment
```

```
                                02BE    974 ;       :  : UNITL increment = MSB of address
                                02BE    975 ;       :  ENDREPEAT
                                02BE    976 ;       ENDSUBTEST Moving Inversions
                                02BE    977 ;
                                02BE    978 ;
                                02BE    979 ;-
                                02BE    980
                                02BE    981
                                02BE    982         $DS_BGNSUB
                                02BE        T13_S4::
    00010030 9F   00000024'EF   FA  02BE                    CALLG   $S$, a#DS$BGNSUB
    0000000C'EF   000003EE'EF   DE  02C9    983             MOVAL   PCS$RENTRY1,PCS$A_RETURN; load rentry address for unexpected MC
                                    02D4    984             $DS_SETVEC_S    VECTOR=#SCB$L_MACHCHK,SRVADR=PCS$CHECK_MCHK
                          00    DD  02D4                    PUSHL   #0
                 000004B8'EF   DF  02D6                    PUSHAL  PCS$CHECK_MCHK
                          04    DD  02DC                    PUSHL   #SCB$L_MACHCHK
              00010160 9F   03  FB  02DE                    CALLS   #3, a#DS$SETVEC
                                02E5    985 PCS$TAG1:
                 00000014'EF  D4  02E5    986             CLRL    PCS$L_FLAGS             ; initialize flags
                 00000008'EF  D4  02EB    987             CLRL    PCS$L_ROW               ; start with row 0
              00000004'EF   10  D0  02F1    988 5$:         MOVL    #16,PCS$L_INC           ; initialize address increment
                 000003C4'EF  16  02F8    989 10$:        JSB     PCS$SETUP_ADDR          ; go set up address table for this inc
              53 000001EC'EF  DE  02FE    990 20$:        MOVAL   PCS$DATA_TABLE,R3       ; setup pointer to read data
              54 000001F0'EF  DE  0305    991             MOVAL   PCS$DATA_TABLE+4,R4     ; setup pointer to write data
           09 00000014'EF   03  E1  030C    992 30$:        BBC     #PCS$V_REVERSE,PCS$L_FLAGS,40$
                                0314    993                                             ; br = doing forward
              52   000003FF 8F  D0  0314    994             MOVL    #1023,R2                ; point offset to last address in table
                          02    11  031B    995             BRB     50$                     ; skip
                          52    D4  031D    996 40$:        CLRL    R2                      ; point offset to first address in table
           5B   00000000'EF    D0  031F    997 50$:        MOVL    PCS$A_PCS_BUFFER,R11    ; get starting address of addresses
                   5A   6B42   D0  0326    998             MOVL    (R11)[R2],R10           ; load address of data
                        55 6A  D0  032A    999             MOVL    (R10),R5                ; read data
    55   55   14   00  EF  032D   1000             EXTZV   #0,#20,R5,R5                    ; extract data from longword
                   63   55  D1  0332   1001             CMPL    R5,(R3)                 ; check data read
                   1D   13  0335   1002             BEQL    60$                     ; br = data good
                            0337   1003             $DS_ERRHARD_S   UNIT=#0,MSGADR=PCS$T_MI_ERR1,PRLINK=PCS$MI_ERR,-
                            0337   1004                             P1=R10,P2=R5,P3=(R3)
                   63   DD  0337                    PUSHL   (R3)
                   55   DD  0339                    PUSHL   R5
                   5A   DD  033B                    PUSHL   R10
                00000955'EF DF  033D                    PUSHAL  PCS$MI_ERR
                0000079A'EF DF  0343                    PUSHAL  PCS$T_MI_ERR1
                   00   DD  0349                    PUSHL   #0
                   01   DD  034B                    PUSHL   #$ER
                            034D        ;;; TEST 13, SUBTEST 4, ERROR 1
    000100D0 9F    07   FB  034D                    CALLS   #$$M, a#DS$ERRHARD
                6A 64   D0  0354   1005 60$:    MOVL    (R4),(R10)              ; write data
                55 6A   D0  0357   1006          MOVL    (R10),R5                ; read data
    55   55   14   00  EF  035A   1007          EXTZV   #0,#20,R5,R5            ; extract data from longword
                   64   55  D1  035F   1008          CMPL    R5,(R4)                 ; check data read
                   1D   13  0362   1009          BEQL    70$                     ; br = data good
                            0364   1010          $DS_ERRHARD_S   UNIT=#0,MSGADR=PCS$T_MI_ERR2,PRLINK=PCS$MI_ERR,-
                            0364   1011                          P1=R10,P2=R5,P3=(R4)
                   64   DD  0364                    PUSHL   (R4)
                   55   DD  0366                    PUSHL   R5
```

```
                        5A   DD  0368                        PUSHL   R10
                 00000955'EF   DF  036A                        PUSHAL  PCS$MI_ERR
                 000007D0'EF   DF  0370                        PUSHAL  PCS$T_MI_ERR2
                        00   DD  0376                        PUSHL   #0
                        02   DD  0378                        PUSHL   #$ER
                                 037A        ;;; TEST 13, SUBTEST 4, ERROR 2
          000100D0 9F   07   FB  037A                        CALLS   #$$M, a#DS$ERRHARD
                                 0381  1012 70$:     $DS_BREAK
          00010058 9F   6E   FA  0381                        CALLG   (SP), a#DS$BREAK
       07 00000014'EF   03   E1  0388  1013          BBC     #PCS$V_REVERSE,PCS$L_FLAGS,80$
                                 0390  1014                                          ; br = forward direction
                   52   01   C2  0390  1015          SUBL2   #1,R2                   ; index to next address (reverse)
                        8A   18  0393  1016          BGEQ    50$                     ; br = not finished
                        0F   11  0395  1017          BRB     100$                    ; skip
                   52   01   C0  0397  1018 80$:     ADDL2   #1,R2                   ; index to next address (forward)
          000003FF 8F   52   D1  039A  1019          CMPL    R2,#1023                ; finished forward
                        03   14  03A1  1020          BGTR    100$                    ; br = finished
                      FF79   31  03A3  1021          BRW     50$                     ; not finished
                   84   83   D1  03A6  1022 100$:    CMPL    (R3)+,(R4)+             ; update data
                        63   D5  03A9  1023          TSTL    (R3)                    ; check for data done
                        03   13  03AB  1024          BEQL    105$                    ; br = do reverse
                      FF5C   31  03AD  1025          BRW     30$                     ; br = do forward for next data
       0A 00000014'EF   03   E0  03B0  1026 105$:    BBS     #PCS$V_REVERSE,PCS$L_FLAGS,108$
                                 03B8  1027                                          ; br = reverse done
          00000014'EF   08   C8  03B8  1028          BISL2   #PCS$M_REVERSE,PCS$L_FLAGS
                                 03BF  1029                                          ; set reverse flag
                      FF3C   31  03BF  1030          BRW     20$                     ; do reverse
00000004'EF   00000004'EF   01   9C  03C2  1031 108$:   ROTL    #1,PCS$L_INC,PCS$L_INC  ; shift increment
       03 00000004'EF   0E   E0  03CE  1032          BBS     #PCS$V_BIT14,PCS$L_INC,109$
                                 03D6  1033                                          ; br = all increments done
                      FF1F   31  03D6  1034          BRW     10$                     ; go do another increment
          00000008'EF   04   C0  03D9  1035 109$:    ADDL2   #4,PCS$L_ROW            ; update row to test
                                 03E0  1036 ;        CMPL    PCS$L_ROW,#8            ; check for finished 5.2
          0C   00000008'EF   D1  03E0  1037          CMPL    PCS$L_ROW,#12           ; check for finished
                        03   14  03E7  1038          BGTR    110$                    ; br = finished
                      FF05   31  03E9  1039          BRW     5$                      ; br = not finished
                        1C   11  03EC  1040 110$:    BRB     PCS$TAG2
                                 03EE  1041 PCS$RENTRY1:
                                 03EE  1042          $DS_ERRHARD_S   UNIT=#0,MSGADR=PCS$T_CS_PARITY1
                        00   DD  03EE                        PUSHL   #0
                 000004FF'EF   DF  03F0                        PUSHAL  PCS$T_CS_PARITY1
                        00   DD  03F6                        PUSHL   #0
                        03   DD  03F8                        PUSHL   #$ER
                                 03FA        ;;; TEST 13, SUBTEST 4, ERROR 3
          000100D0 9F   04   FB  03FA                        CALLS   #$$M, a#DS$ERRHARD
                                 0401  1043          $DS_CKLOOP      PCS$TAG1
      00010040 9F   FEE0 CF   FA  0401                        CALLG   PCS$TAG1, a#DS$CKLOOP
                                 040A  1044 PCS$TAG2:
                                 040A  1045          $DS_CLRVEC_S    VECTOR=SCB$L_MACHCHK
                 00000004'EF   DD  040A                        PUSHL   SCB$L_MACHCHK
          00010168 9F   01   FB  0410                        CALLS   #1, a#DS$CLRVEC
                                 0417  1046          $DS_ENDSUB
                                 0417        T13_S4_X:
   00010038 9F   00000024'EF   FA  0417                        CALLG   $S$, a#DS$ENDSUB
                                 0422  1047
```

```
                                 0422  1048          $DS_ENDTEST
                50    01    D0   0422                        MOVL    #1, R0          ; NORMAL EXIT
                                 0425        TEST_013_X::
        00010058 9F    6E    FA   0425                        CALLG   (SP), a#DS$BREAK
                             04   042C                        RET                     ; RETURN TO TEST SEQUENCER
                                 042D  1049
                                 042D  1050          $DS_PAGE
```

```
                            042D                .SBTTL  TEST 14:  PCS Execution Test
                        00000000                .PSECT  TEST_014, PAGE, NOWRT
                            0018
                            0018  1053 ;++
                            0018  1054 ; Test description:
                            0018  1055 ;
                            0018  1056 ;       This test checks that micro code can be executed out of patch
                            0018  1057 ;       control store.
                            0018  1058 ;
                            0018  1059 ;--
                            0018  1060
                            0018  1061          $DS_BGNTEST     <PCS,DEFAULT,ALL>
                            0018        DATA_014:
                        00000000    0018                .LONG   0                   ; TEST ARGUMENT TABLE TERMINATOR
                            001C        TEST_014::
                            0000    001C                .WORD   ^M<>                ; ENTRY MASK
          54    00000000'8F   DB    001E  1062          MFPR    #PR$_SID,R4         ; get system id register
        55    54    08    08    EF    0025  1063          EXTZV   #8,#8,R4,R5         ; extract the micro code revision level
         00000000'EF    55    D1    002A  1064          CMPL    R5,L_REV_CHECK      ; check the revision level
                        45    1A    0031  1065          BGTRU   5$                  ; br = this is a L0008 module
         0000FE54'EF    01    D1    0033  1066          CMPL    #1,DSA$GL_PASSNO    ; ckeck for first pass
                        03    13    003A  1067          BEQLU   1$                  ; br = first pass
                      0020    31    003C  1068          BRW     2$                  ; Not first pass, skip to 2$
    0000FE00'EF    80000000 8F    D3    003F  1069 1$:       BITL    #DSA$M_APT,DSA$GL_FLAGS ; Check to see if APT is present
                        19    13    004A  1070          BEQLU   3$                  ; Branch = No APT
                              004C  1071          $DS_ERRHARD_S   UNIT=#0,MSGADR=PCS$T_NO_PCS
                        00    DD    004C                PUSHL   #0
                00000623'EF   DF    004E                PUSHAL  PCS$T_NO_PCS
                        00    DD    0054                PUSHL   #0
                        01    DD    0056                PUSHL   #$ER
                              0058        ;;; TEST 14, SUBTEST 0, ERROR 1
          000100D0 9F   04    FB    0058                CALLS   #$$M, @#DS$ERRHARD
                              005F  1072                                          ; ERRHARD is for APT, NO L0008 module
                              005F  1073 2$:      $DS_EXIT        TEST
                50    01    D0    005F                MOVL    #1,R0               ; NOT AN ERROR
                    02C3    31    0062                BRW     TEST_014_X          ; EXIT TEST 14
                              0065  1074 3$:      $DS_PRINTF_S    FORMAT=PCS$T_NO_PCS
             00000623'EF    9F    0065                PUSHAB  PCS$T_NO_PCS
          000100F0 9F   01    FB    006B                CALLS   #$$N, @#DS$PRINTF
                              0072  1075          $DS_EXIT        TEST                ; not L0008 module, exit the test
                50    01    D0    0072                MOVL    #1,R0               ; NOT AN ERROR
                    02B0    31    0075                BRW     TEST_014_X          ; EXIT TEST 14
          54    00000018'EF   D0    0078  1076 5$:      MOVL    PCS$A_PCS_ADDRESS,R4
                              007F  1077          $DS_PROBE_S     ADDRESS=(R4),LENGTH=#4,UNIT=#0
                        00    DD    007F                PUSHL   #0
                        04    DD    0081                PUSHL   #4
                        64    9F    0083                PUSHAB  (R4)
          000101A0 9F   03    FB    0085                CALLS   #3, @#DS$PROBE
                      42 50   E8    008C  1078          BLBS    R0,15$              ; br = address responded
          0000FE54'EF   01    D1    008F  1079          CMPL    #1,DSA$GL_PASSNO    ; ckeck for first pass
                        33    12    0096  1080          BNEQ    10$                 ; br = not first pass
    0000FE00'EF    80000000 8F    D3    0098  1081          BITL    #DSA$M_APT,DSA$GL_FLAGS ; Check to see if APT is present
                        19    13    00A3  1082          BEQLU   8$                  ; Branch = No APT
                              00A5  1083          $DS_ERRHARD_S   UNIT=#0,MSGADR=PCS$T_PCS_NORESPOND
                        00    DD    00A5                PUSHL   #0
```

```
                0000064D'EF   DF  00A7                      PUSHAL  PCS$T_PCS_NORESPOND
                        00    DD  00AD                      PUSHL   #0
                        02    DD  00AF                      PUSHL   #$ER
                              00B1        ;;; TEST 14, SUBTEST 0, ERROR 2
            000100D0 9F   04  FB  00B1                      CALLS   #$$M, a#DS$ERRHARD
                              00B8  1084                                ; ERRHARD is for APT, No response
                              00B8  1085                                ; from the PCS module
                              00B8  1086          $DS_EXIT            TEST
                        50    01  D0  00B8                      MOVL    #1,R0             ; NOT AN ERROR
                           026A   31  00BB                      BRW     TEST_014_X        ; EXIT TEST 14
                              00BE  1087 6$:      $DS_PRINTF_S        FORMAT=PCS$T_PCS_NORESPOND
                0000064D'EF   9F  00BE                      PUSHAB  PCS$T_PCS_NORESPOND
            000100F0 9F   01  FB  00C4                      CALLS   #$$N, a#DS$PRINTF
                              00CB  1088 10$:     $DS_EXIT            TEST
                        50    01  D0  00CB                      MOVL    #1,R0             ; NOT AN ERROR
                           0257   31  00CE                      BRW     TEST_014_X        ; EXIT TEST 14
                        25    01  DA  00D1  1089 15$:     MTPR    #1,#PR750$_CADR           ; disable cache
                              00D4  1090          $DS_SETVEC_S        VECTOR=#SCB$L_MACHCHK,SRVADR=PCS$CHECK_MCHK
                              00D4                      PUSHL   #0
                0000004B8'EF  DF  00D6                      PUSHAL  PCS$CHECK_MCHK
                              04  DD  00DC                      PUSHL   #SCB$L_MACHCHK
            00010160 9F   03  FB  00DE                      CALLS   #3, a#DS$SETVEC
                 000002CE'EF  16  00E5  1091          JSB     PCS$CLEAR_PCS             ; initialize PCS
                              00EB  1092          $DS_PAGE
                              00EB  1093
                              00EB  1094
```

```
                                00EB                    .SBTTL  SUBTEST 14.1:  PCS Entry/Exit
                                00EB  1097 ;+
                                00EB  1098 ; Subtest description:
                                00EB  1099 ;
                                00EB  1100 ;       This subtest attempts to execute from PCS, an instruction which will
                                00EB  1101 ;       load the "D" register with an initial value and then decrement the
                                00EB  1102 ;       value and write it into general purpose register R5. The NOP
                                00EB  1103 ;       instruction is used to execute from PCS and then the register is
                                00EB  1104 ;       checked for the correct results.
                                00EB  1105 ;
                                00EB  1106 ; Subtest steps:
                                00EB  1107 ;
                                00EB  1108 ;       BGNSUBTEST PCS Entry/Exit
                                00EB  1109 ;       :  Disable PCS
                                00EB  1110 ;       :  Initialize flags
                                00EB  1111 ;       :  Initialize register
                                00EB  1112 ;       :  Write micro words into PCS
                                00EB  1113 ;       :  Execute NOP to enter PCS
                                00EB  1114 ;       :  Check register
                                00EB  1115 ;       :  IF Register contents not correct
                                00EB  1116 ;       :  :  THEN
                                00EB  1117 ;       :  :  Report error
                                00EB  1118 ;       :  ENDIF
                                00EB  1119 ;       ENDSUBTEST PCS Entry/Exit
                                00EB  1120 ;
                                00EB  1121 ;
                                00EB  1122 ;
                                00EB  1123 ;-
                                00EB  1124
                                00EB  1125          $DS_BGNSUB
                                00EB        T14_S1::
00010030 9F   00000030'EF    FA 00EB                CALLG   $S$, a#DS$BGNSUB
              00000014'EF    D4 00F6  1126          CLRL    PCS$L_FLAGS              ; initialize flags
              00000000'EF    D4 00FC  1127          CLRL    PCS$L_COUNT              ; setup count for this subtest
0000000C'EF   00000151'EF    DE 0102  1128          MOVAL   PCS$RENTRY2,PCS$A_RETURN; load rentry address for unexpected MC
                                010D  1129 PCS$TAG3:
                 55    10    D0 010D  1130          MOVL    #16,R5                   ; initialize test register
          0000001C'FF    01    D0 0110  1131          MOVL    #1,@PCS$A_ENA_ADDRESS    ; Enable writing of patch bit
          57    00000020'EF    D0 0117  1132          MOVL    PCS$A_PTH_LOCATION,R7    ; load address of patch bit to enable
                       67    D4 011E  1133          CLRL    (R7)                     ; Clear (enable) the patch bit
                0000001C'FF    D4 0120  1134          CLRL    @PCS$A_ENA_ADDRESS       ; Disable writing of patch bit
                000003FC'EF    16 0126  1135          JSB     PCS$LOAD_MICRO           ; load pcs with micro code and enable
                             01 012C  1136          NOP                              ; The microword that perfroms the NOP
                                012D  1137                                           ; has the patch bit set with a next
                                012D  1138                                           ; address of 0002 which will cause a
                                012D  1139                                           ; trap to PCS 2802.
                00000018'FF    D4 012D  1140          CLRL    @PCS$A_PCS_ADDRESS       ; disable PCS
                    0F   55    D1 0133  1141          CMPL    R5,#15                   ; check that register decremented twice
                         45    13 0136  1142          BEQL    PCS$TAG4                 ; br = data good
                                0138  1143          $DS_ERRHARD_S   UNIT=#0,MSGADR=PCS$T_ENTRY_ERR,PRLINK=PCS$PCS_ERR
                0000097B'EF    DF 0138                PUSHAL  PCS$PCS_ERR
                00000805'EF    DF 013E                PUSHAL  PCS$T_ENTRY_ERR
                         00    DD 0144                PUSHL   #0
                         01    DD 0146                PUSHL   #$ER
                                0148        ;;; TEST 14, SUBTEST 1, ERROR 1
```

```
                000100D0 9F    04    FB  0148                          CALLS   #$$M, a#DS$ERRHARD
                               2C    11  014F  1144                    BRB     PCS$TAG4
                                         0151  1145 PCS$RENTRY2:
    00000018'FF    000186A0 8F    CA    0151  1146                    BICL2   #00100000,@PCS$A_PCS_ADDRESS
                                         015C  1147                    $DS_ERRHARD_S   UNIT=#0,MSGADR=PCS$T_CS_PARITY2
                                   00    DD  015C                      PUSHL   #0
                         00000532'EF     DF  015E                      PUSHAL  PCS$T_CS_PARITY2
                                   00    DD  0164                      PUSHL   #0
                                   02    DD  0166                      PUSHL   #$ER
                                         0168                  ;;; TEST 14, SUBTEST 1, ERROR 2
                000100D0 9F    04    FB  0168                          CALLS   #$$M, a#DS$ERRHARD
                     000002CE'EF     16  016F  1148                    JSB     PCS$CLEAR_PCS
                                         0175  1149                    $DS_CKLOOP      PCS$TAG3
          00010040 9F    95 AF    FA  0175                          CALLG   PCS$TAG3, a#DS$CKLOOP
                                         017D  1150 PCS$TAG4:
                     000002CE'EF     16  017D  1151                    JSB     PCS$CLEAR_PCS           ; initialize PCS
                                         0183  1152                    $DS_ENDSUB
                                         0183                  T14_S1_X:
    00010038 9F    00000030'EF     FA  0183                          CALLG   $S$, a#DS$ENDSUB
                                         018E  1153
                                         018E  1154                    $DS_PAGE
                                         018E  1155
                                         018E  1156
```

```
                                018E                    .SBTTL  SUBTEST 14.2:  PCS "Next Field" Addressing
                                018E  1159 ;+
                                018E  1160 ; Subtest description:
                                018E  1161 ;
                                018E  1162 ;       This subtest checks the PCS "next field" portion of the micro word to
                                018E  1163 ;       insure that each bit produces the proper transfer address. This is
                                018E  1164 ;       accomplished by filling PCS memory with micro words that decrement
                                018E  1165 ;       general purpose register R5 and have a "next field" which points to
                                018E  1166 ;       the next PCS location. This subtest is an extened version of the
                                018E  1167 ;       previous subtest and runs thru all of PCS memory. An NOP instruction
                                018E  1168 ;       is executed to execute from PCS and afterwards R5 is checked to have
                                018E  1169 ;       the expected value.
                                018E  1170 ;
                                018E  1171 ; Subtest steps:
                                018E  1172 ;
                                018E  1173 ;       BGNSUBTEST PCS "Next Field" Addressing
                                018E  1174 ;       :  Disable PCS
                                018E  1175 ;       :  Initialize flags
                                018E  1176 ;       :  Initialize register
                                018E  1177 ;       :  Write PCS with micro words for all PCS
                                018E  1178 ;       :  Execute NOP instruction
                                018E  1179 ;       :  Check register to have decremented properly
                                018E  1180 ;       :  IF register contains wrong data
                                018E  1181 ;       :  :  THEN
                                018E  1182 ;       :  :  Report error
                                018E  1183 ;       :  ENDIF
                                018E  1184 ;       ENDSUBTEST PCS "Next Field" Addressing
                                018E  1185 ;
                                018E  1186 ;--
                                018E  1187
                                018E  1188          $DS_BGNSUB
                                018E        T14_S2::
00010030 9F   0000003C'EF   FA  018E                CALLG   $S$, a#DS$BGNSUB
              00000014'EF   D4  0199  1189          CLRL    PCS$L_FLAGS             ; initialize flags
00000000'EF   000003E5 8F   D0  019F  1190          MOVL    #997,PCS$L_COUNT        ; setup count for all locations
0000000C'EF   000001FD'EF   DE  01AA  1191          MOVAL   PCS$RENTRY3,PCS$A_RETURN; load rentry address for unexpected MC
                                01B5  1192 PCS$TAG5:
        55    000003F5 8F   D0  01B5  1193          MOVL    #1013,R5                ; initialize test register
              0000001C'FF   01  D0  01BC  1194          MOVL    #1,aPCS$A_ENA_ADDRESS   ; Enable writing of patch bit
        57    00000020'EF   D0  01C3  1195          MOVL    PCS$A_PTH_LOCATION,R7   ; load address of patch bit to enable
                        67  D4  01CA  1196          CLRL    (R7)                    ; Clear (enable) the patch bit
              0000001C'FF   D4  01CC  1197          CLRL    aPCS$A_ENA_ADDRESS      ; Disable writing of patch bit
              000003FC'EF   16  01D2  1198          JSB     PCS$LOAD_MICRO          ; load pcs with micro code
                            01  01D8  1199          NOP                             ; The microword that perfroms the NOP
                                01D9  1200                                          ; has the patch bit set with a next
                                01D9  1201                                          ; address of 0002 which will cause a
                                01D9  1202                                          ; trap to PCS 2802.
              00000018'FF   D4  01D9  1203          CLRL    aPCS$A_PCS_ADDRESS      ; disable PCS
                  0E    55  D1  01DF  1204          CMPL    R5,#14                  ; check that register decremented
                        45  13  01E2  1205          BEQL    PCS$TAG6                ; br = data good
                                01E4  1206          $DS_ERRHARD_S   UNIT=#0,MSGADR=PCS$T_NXFIELD_ERR,PRLINK=PCS$PCS_ERR
              0000097B'EF   DF  01E4                PUSHAL  PCS$PCS_ERR
              0000082A'EF   DF  01EA                PUSHAL  PCS$T_NXFIELD_ERR
                        00  DD  01F0                PUSHL   #0
                        01  DD  01F2                PUSHL   #$ER
```

```
                                 01F4          ;;; TEST 14, SUBTEST 2, ERROR 1
            000100D0 9F    04    FB  01F4                    CALLS   #$$M, a#DS$ERRHARD
                           2C    11  01FB  1207              BRB     PCS$TAG6
                                 01FD  1208 PCS$RENTRY3:
    00000018'FF    000186A0 8F    CA  01FD  1209              BICL2   #00100000,aPCS$A_PCS_ADDRESS
                                 0208  1210              $DS_ERRHARD_S   UNIT=#0,MSGADR=PCS$T_CS_PARITY3
                           00    DD  0208                    PUSHL   #0
                 0000055E'EF     DF  020A                    PUSHAL  PCS$T_CS_PARITY3
                           00    DD  0210                    PUSHL   #0
                           02    DD  0212                    PUSHL   #$ER
                                 0214          ;;; TEST 14, SUBTEST 2, ERROR 2
            000100D0 9F    04    FB  0214                    CALLS   #$$M, a#DS$ERRHARD
                 000002CE'EF     16  021B  1211              JSB     PCS$CLEAR_PCS
                                 0221  1212              $DS_CKLOOP      PCS$TAG5
          00010040 9F    91 AF    FA  0221                    CALLG   PCS$TAG5, a#DS$CKLOOP
                                 0229  1213 PCS$TAG6:
                 000002CE'EF     16  0229  1214              JSB     PCS$CLEAR_PCS           ; initialize PCS
                                 022F  1215              $DS_ENDSUB
                                 022F          T14_S2_X:
    00010038 9F    0000003C'EF     FA  022F                    CALLG   $S$, a#DS$ENDSUB
                                 023A  1216
```

```
                        023A  1218          $DS_SBTTL       <PCS Parity Error ABORT>
                        023A                .SBTTL  SUBTEST 14.3:  PCS Parity Error ABORT
                        023A  1219 ;+
                        023A  1220 ; Subtest description:
                        023A  1221 ;
                        023A  1222 ;       This subtest attempts to execute from PCS, an instruction which will
                        023A  1223 ;       attempt to load the "D" register with an initial value and then
                        023A  1224 ;       decrement the value and write it into general purpose register R5.
                        023A  1225 ;       The NOP instruction is used to transfer control to PCS.  Entry into
                        023A  1226 ;       PCS is at 2802 (where D_R[R5],NEXT/2800 is executed).  Then, at
                        023A  1227 ;       location 2800 ( where D_D-1,NEXT/2801 is executed) a parity error
                        023A  1228 ;       should be detected.
                        023A  1229 ;
                        023A  1230 ; Subtest steps:
                        023A  1231 ;
                        023A  1232 ;       BGNSUBTEST PCS Entry/Exit
                        023A  1233 ;       :  Disable PCS
                        023A  1234 ;       :  Initialize flags
                        023A  1235 ;       :  Write micro words into PCS
                        023A. 1236 ;       :  Set-up Return addresses
                        023A  1237 ;       :  Set the appropriate Patch Bit
                        023A  1238 ;       :  Execute NOP to enter PCS
                        023A  1239 ;       :  Capture the Machine Check
                        023A  1240 ;       :  IF the Machine Check is incorrect
                        023A  1241 ;       :  :  THEN
                        023A  1242 ;       :  :  Report error
                        023A  1243 ;       :  ENDIF
                        023A  1244 ;       ENDSUBTEST PCS Parity Error ABORT
                        023A  1245 ;
                        023A  1246 ;
                        023A  1247 ;
                        023A  1248 ;-
                        023A  1249
                        023A  1250
                        023A  1251          $DS_BGNSUB
                        023A              T14_S3::
00010030 9F   00000048'EF   FA  023A                  CALLG   $S$, a#DS$BGNSUB
              00000014'EF   D4  0245  1252          CLRL    PCS$L_FLAGS                 ; initialize flags
              00000000'EF   D4  024B  1253          CLRL    PCS$L_COUNT                 ; setup count for this subtest
                            0251  1254          $DS_SETVEC_S    VECTOR=#SCB$L_MACHCHK,SRVADR=PCS$CHECK_MCHK
                         00 DD  0251                  PUSHL   #0
                000004B8'EF DF  0253                  PUSHAL  PCS$CHECK_MCHK
                         04 DD  0259                  PUSHL   #SCB$L_MACHCHK
          00010160 9F    03 FB  025B                  CALLS   #3, a#DS$SETVEC
          00000014'EF    20 8B  0262  1255          BISB2   #PCS$M_EXP_CS_PAR,PCS$L_FLAGS
                            0269  1256                                          ; Set flag specifying that we expect a
                            0269  1257                                          ; control store parity error.
          56    0000000C'EF   DE  0269  1258          MOVAL   PCS$A_RETURN,R6     ; Load address of return address table
          66    0000029F'EF   DE  0270  1259          MOVAL   PCS$RENTRY4,(R6)    ; load rentry address CS Parity error
                            0277  1260                                          ; machine check
       04 A6    000002BE'EF   DE  0277  1261          MOVAL   PCS$RENTRY5,4(R6)   ; Load rentry address for unexpected
                            027F  1262                                          ; machine check (not CS parity error)
                            027F  1263 PCS$TAG7:
          0000001C'FF    01   D0  027F  1264          MOVL    #1,aPCS$A_ENA_ADDRESS   ; Enable writing of patch bit
          57    00000020'EF   D0  0286  1265          MOVL    PCS$A_PTH_LOCATION,R7   ; load address of patch bit to enable
```

```
                      67   D4   028D  1266          CLRL    (R7)                            ; Clear (enable) the patch bit
              0000001C'FF  D4   028F  1267          CLRL    @PCS$A_ENA_ADDRESS              ; Disable writing of patch bit
              000003FC'EF  16   0295  1268          JSB     PCS$LOAD_MICRO                  ; load pcs with micro code
                           029B  1269 PCS$PTH_INST:
                           01   029B  1270          NOP                                     ; The microword that perfroms the NOP
                           029C  1271                                                       ; has the patch bit set with a next
                           029C  1272                                                       ; address of 0002 which will cause a
                           029C  1273                                                       ; trap to PCS 2802.
                    001F   31   029C  1274          BRW     PCS$RENTRY5                     ; If we end up here then there was no
                           029F  1275                                                       ; parity error when executing the
                           029F  1276                                                       ; patch Nop instruction
                           029F  1277 PCS$RENTRY4:
00000018'FF   000186A0 8F   CA   029F  1278          BICL2   #00100000,@PCS$A_PCS_ADDRESS
                           02AA  1279                                                       ; disable PCS
                           02AA  1280          $DS_CLRVEC_S    VECTOR=#SCB$L_MACHCHK
                      04   DD   02AA                        PUSHL   #SCB$L_MACHCHK
          00010168 9F   01   FB   02AC                        CALLS   #1, @#DS$CLRVEC
                           02B3  1281          $DS_CLRVEC_S    VECTOR=#SCB$L_OPCCUS
                      14   DD   02B3                        PUSHL   #SCB$L_OPCCUS
          00010168 9F   01   FB   02B5                        CALLS   #1, @#DS$CLRVEC
                      46   11   02BC  1282          BRB     PCS$TAG8
                           02BE  1283 PCS$RENTRY5:
00000018'FF   000186A0 8F   CA   02BE  1284          BICL2   #00100000,@PCS$A_PCS_ADDRESS
                           02C9  1285                                                       ; disable PCS
                           02C9  1286          $DS_CLRVEC_S    VECTOR=#SCB$L_MACHCHK
                      04   DD   02C9                        PUSHL   #SCB$L_MACHCHK
          00010168 9F   01   FB   02CB                        CALLS   #1, @#DS$CLRVEC
                           02D2  1287          $DS_CLRVEC_S    VECTOR=#SCB$L_OPCCUS
                      14   DD   02D2                        PUSHL   #SCB$L_OPCCUS
          00010168 9F   01   FB   02D4                        CALLS   #1, @#DS$CLRVEC
                           02DB  1288          $DS_ERRHARD_S   UNIT=#0,PRLINK=PCS$NO_PARERR_MSG,P1=#PCS$T_PCS_ERR,-
                           02DB  1289                          P2=#PCS$TABLE1
               00000210'8F   DD   02DB                        PUSHL   #PCS$TABLE1
               000005BB'8F   DD   02E1                        PUSHL   #PCS$T_PCS_ERR
               00000996'EF   DF   02E7                        PUSHAL  PCS$NO_PARERR_MSG
                           00   DD   02ED                        PUSHL   #0
                           00   DD   02EF                        PUSHL   #0
                           01   DD   02F1                        PUSHL   #$ER
                           02F3       ;;; TEST 14, SUBTEST 3, ERROR 1
000100D0 9F   06   FB   02F3                        CALLS   #$$M, @#DS$ERRHARD
                           02FA  1290          $DS_BCOMPLETE   PCS$TAG8
                07 50   E8   02FA                        BLBS    R0, PCS$TAG8
                           02FD  1291          $DS_ABORT
00010020 9F   6C   FA   02FD                        CALLG   (AP), @#DS$ABORT
                           0304  1292 PCS$TAG8:
               000002CE'EF   16   0304  1293          JSB     PCS$CLEAR_PCS                   ; Initialize/Disable PCS
0000FE08 9F   01   D1   030A  1294          CMPL    #1,@#DSA$GL_PASSES              ; check to if more then one pass to run
                      07   13   0311  1295          BEQLU   PCS$NO_LOAD_PCS                 ; br = only 1 pass specified, don't
                           0313  1296                                                       ; load PCS
                           0313  1297          $DS_LOADPCS_S                           ; Re-load patch micro code and patch
000101C0 9F   00   FB   0313                        CALLS   #0, @#DS$LOADPCS
                           031A  1298                                                       ; bits
                           031A  1299 PCS$NO_LOAD_PCS:
                           031A  1300          $DS_ENDSUB
                           031A       T14_S3_X:
```

```
00010038 9F   00000048'EF    FA  031A                        CALLG   $S$, a#DS$ENDSUB
                             0325  1301
                             0325  1302          $DS_ENDTEST
                  50   01    D0  0325                        MOVL    #1, R0          ; NORMAL EXIT
                             0328        TEST_014_X::
          00010058 9F   6E    FA  0328                        CALLG   (SP), a#DS$BREAK
                             04  032F                        RET                     ; RETURN TO TEST SEQUENCER
                             0330  1303
                             0330  1304          $DS_ENDMOD
                         00000000                            .PSECT  $TSTCNT, NOEXE, NOWRT, OVR, LONG
                     0000000E  0000                          .LONG   $TN
                             0004  1305          .END
```

```
$$$                     = 00000048 R     05
$$ARGS                  = 0000000A
$$E                     = 00000003
$$M                     = 00000006
$$N                     = 00000001
$$S                     = FFFFFFFF
$$T1                    = 0000002C
$ENV                    = 00000001  G
$ER                     = FFFFFFFF
$MO                     = 00000001  G
$S$                     = 00000048 R     05
$ST                     = 00000000
$TN                     = 0000000E
ALL                     = 00000009  G
A_MCHK_BUFFER             ********    X   01
BASE_013                  00000000 R     03
BASE_014                  00000000 R     06
BIT...                  = 0000001A
CEP_FUNCTIONAL          = 00000000
CEP_REPAIR              = 00000001
DATA_013                  00000014 R     03
DATA_014                  00000018 R     06
DEFAULT                 = 00000000  G
DS$ABORT                  00010020
DS$ASKADR                 00010090
DS$ASKDATA                00010080
DS$ASKLGCL                00010098
DS$ASKSTR                 000100A0
DS$ASKVLD                 00010088
DS$ATTACH                 000101A8
DS$BGNSUB                 00010030
DS$BRANCH                 000100A8
DS$BREAK                  00010058
DS$CANWAIT                00010070
DS$CHANNEL                00010180
DS$CKLOOP                 00010040
DS$CLRVEC                 00010168
DS$CNTRLC                 00010078
DS$CVTREG                 000100B0
DS$ENDPASS                00010010
DS$ENDSUB                 00010038
DS$ERRDEV                 000100C8
DS$ERRHARD                000100D0
DS$ERRPREP                00010108
DS$ERRSOFT                000100D8
DS$ERRSYS                 000100C0
DS$ESCAPE                 00010050
DS$FREEDBGSYM             000101B8
DS$GETBUF                 00010120
DS$GETMEM                 00010130
DS$GETTERM                000101C8
DS$GPHARD                 00010018
DS$HELP                   000101B0
DS$INITSCB                00010170
DS$INLOOP                 00010048
DS$LOAD                   00010198
DS$LOADPCS                000101C0
DS$MAPDBGBLOCK            00010118
DS$MEMSIZE                000101D8
DS$MMOFF                  00010158
DS$MMON                   00010150
DS$MOVPHY                 00010148
DS$MOVVRT                 00010140
DS$PARSE                  000100B8
DS$PRINTB                 000100E0
DS$PRINTF                 000100F0
DS$PRINTS                 000100F8
DS$PRINTSIG               00010100
DS$PRINTX                 000100E8
DS$PROBE                  000101A0
DS$RELBUF                 00010128
DS$RELMEM                 00010138
DS$SERVICE_DISPATCHER     000101D0
DS$SETIPL                 00010178
DS$SETMAP                 00010188
DS$SETPRIEXV              00010110
DS$SETVEC                 00010160
DS$SHOCHAN                00010190
DS$SUMMARY                00010028
DS$WAITMS                 00010060
DS$WAITUS                 00010068
DS$_ARITH               = 006600D0
DS$_ASBE                = 00660118
DS$_BADLINK             = 006600F0
DS$_BADTYPE             = 006600E8
DS$_BIIC                = 00660120
DS$_CHME                = 006600A8
DS$_CHMK                = 006600E0
DS$_DEVNAME             = 00660108
DS$_ERROR               = 00660002
DS$_FHWE                = 00660068
DS$_FRAGBUF             = 00660080
DS$_ICBUSY              = 006600C8
DS$_ICERR               = 006600C0
DS$_IHWE                = 00660060
DS$_ILLCHAR             = 00660018
DS$_ILLPAGCNT           = 00660078
DS$_ILLUNIT             = 00660100
DS$_INSFMEM             = 00660050
DS$_IPL2HI              = 006600B8
DS$_IVADDR              = 00660040
DS$_IVVECT              = 00660038
DS$_KRNLSTK             = 00660090
DS$_LOGIC               = 00660070
DS$_MCHK                = 00660088
```

```
DS$_MMOFF                       = 00660058
DS$_NEEDUNIT                    = 006600F8
DS$_NODE                        = 00660128
DS$_NOPCS                       = 00660110
DS$_NORMAL                      = 00660001
DS$_NOSUPPORT                   = 006600B1
DS$_NOTDON                      = 00660030
DS$_NOTIMP                      = 006600B0
DS$_NULLSTR                     = 00660010
DS$_OVERFLOW                    = 00660008
DS$_POWER                       = 00660098
DS$_PROGERR                     = 00660020
DS$_SEVERE                      = 00660004
DS$_TRANSL                      = 006600A0
DS$_TRUNCATE                    = 00660028
DS$_UNEXPINT                    = 006600D8
DS$_VASFULL                     = 00660048
DS$_WARNING                     = 00660000
DSA$AL_APTMAIL                    0000FE00
DSA$AT_APTTXT                     0000FA00
DSA$GL_APTCOM                     0000FE04
DSA$GL_DEVLEN                     0000FE58
DSA$GL_ERRNO                      0000FE44
DSA$GL_EVENT                      0000FE48
DSA$GL_FLAGS                      0000FE00
DSA$GL_MSGTYP                     0000FE40
DSA$GL_PASSES                     0000FE08
DSA$GL_PASSNO                     0000FE54
DSA$GL_SECTNO                     0000FE10
DSA$GL_SID                        0000FE14
DSA$GL_SUBTNO                     0000FE4C
DSA$GL_TESTNO                     0000FE50
DSA$GL_UNITS                      0000FE0C
DSA$GQ_MSGPTR                     0000FE68
DSA$GT_DEVNAM                     0000FE5C
DSA$M_APT                       = 80000000
ENV$M_DOMAIN                    = 00000002
ENV$M_LEVEL                     = 00000001
ENV$M_SUPER                     = 000003FC
ENV$S_DOMAIN                    = 00000001
ENV$S_LEVEL                     = 00000001
ENV$S_SUPER                     = 00000008
ENV$V_DOMAIN                    = 00000001
ENV$V_LEVEL                     = 00000000
ENV$V_SUPER                     = 00000002
ENV$_CPU                        = 00000000
ENV$_FUNCTIONAL                 = 00000000
ENV$_REPAIR                     = 00000001
ENV$_SUPER                      = 00000001
ENV$_SYSTEM                     = 00000001
ERR$_MSGADR                     = 0000000C
ERR$_NARGS                      = 0000000A
ERR$_NUM                        = 00000004
ERR$_P1                         = 00000014
ERR$_P2                         = 00000018
ERR$_P3                         = 0000001C
ERR$_P4                         = 00000020
ERR$_P5                         = 00000024
ERR$_P6                         = 00000028
ERR$_POINTER                    = 00000010
ERR$_UNIT                       = 00000008
HALT                            = 00000004  G
HP$A_DEPENDENT                    00000032
HP$A_DEVICE                       00000018
HP$A_DVA                          0000001C
HP$A_LINK                         00000020
HP$B_DRIVE                        0000000B
HP$B_FLAGS                        0000000A
HP$Q_DEVICE                       00000000
HP$T_DEVICE                       0000000C
HP$T_TYPE                         00000026
HP$W_SIZE                         00000008
HP$W_VECTOR                       00000024
IPR                             = 00000006  G
KA$B_ACC_TYPE                     00000042  G
KA$B_NODE_ID                      00000046  G
KA$B_RESERVED                     00000043  G
KA$B_SID_TYPE                     0000003D  G
KA$K_LEN                          0000004B  G
KA$L_FLAGS                        00000032  G
KA$L_MEM_SIZE                     00000047  G
KA$L_SID                          0000003A  G
KA$M_CHAR                       = 00000100  G
KA$M_CRC                        = 00000010  G
KA$M_D_FLOAT                    = 00000002  G
KA$M_EDIT                       = 00000080  G
KA$M_F_FLOAT                    = 00000001  G
KA$M_G_FLOAT                    = 00000004  G
KA$M_H_FLOAT                    = 00000008  G
KA$M_PACKED                     = 00000020  G
KA$M_PACK_MUL                   = 00000040  G
KA$M_SB_ERR                     = 02000000  G
KA$M_TODR                       = 00010000  G
KA$M_WCS_LD                     = 01000000  G
KA$V_CHAR                       = 00000008  G
KA$V_CRC                        = 00000004  G
KA$V_D_FLOAT                    = 00000001  G
KA$V_EDIT                       = 00000007  G
KA$V_F_FLOAT                    = 00000000  G
KA$V_G_FLOAT                    = 00000002  G
KA$V_H_FLOAT                    = 00000003  G
KA$V_PACKED                     = 00000005  G
KA$V_PACK_MUL                   = 00000006  G
KA$V_SB_ERR                     = 00000019  G
KA$V_TODR                       = 00000010  G
KA$V_WCS_LD                     = 00000018  G
KA$W_LATENCY                      0000003E  G
KA$W_MEM_SIZE                     00000044  G
KA$W_PROGRESS                     00000040  G
KA$W_RESERVED                     00000038  G
```

```
KA$W_WCS                        00000036  G
L_REV_CHECK                     ********    X   03
MANUAL                        = 00000001  G
MCHK                          = 00000005  G
MSG_013                         00000002 R      03
MSG_014                         00000002 R      06
PAR$M_ATDEF                   = 00000010
PAR$M_ATHI                    = 00000008
PAR$M_ATLO                    = 00000004
PAR$M_NODEF                   = 00000002
PAR$V_ATDEF                   = 00000004
PAR$V_ATHI                    = 00000003
PAR$V_ATLO                    = 00000002
PAR$V_NODEF                   = 00000001
PAR$_BIN                      = 00000002
PAR$_DEC                      = 0000000A
PAR$_HEX                      = 00000010
PAR$_NO                       = 00000000
PAR$_OCT                      = 00000008
PAR$_YES                      = 00000001
PCS                           = 00000008  G
PCS$ADDR_ERR                    000008FF R      01
PCS$A_ENA_ADDRESS               0000001C R      01
PCS$A_PCS_ADDRESS               00000018 R      01
PCS$A_PCS_BUF                   00000030 R      01
PCS$A_PCS_BUFFER                ********    X   01
PCS$A_PTHBIT_ADDRESS            00000024 R      01
PCS$A_PTH_LOCATION              00000020 R      01
PCS$A_RETURN                    0000000C R      01
PCS$CHECK_MCHK                  000004B8 R      01
PCS$CLEAR_BUFFER                000002B8 R      01
PCS$CLEAR_PCS                   000002CE R      01
PCS$CODEVECTORS                 000001B0 R      01
PCS$CODE_WORDS                  000001C0 R      01
PCS$DATA_PATTERN                00000028 R      01
PCS$DATA_TABLE                  000001EC R      01
PCS$DECODED_WORDS               000000B0 R      01
PCS$DPERR                       0000088C R      01
PCS$F_PCS_ERR                   00000858 R      01
PCS$F_ROWERR1                   0000073C R      01
PCS$F_ROWERR2                   00000757 R      01
PCS$LOAD_MICRO                  000003FC R      01
PCS$L_COUNT                     00000000 R      01
PCS$L_FLAGS                     00000014 R      01
PCS$L_INC                       00000004 R      01
PCS$L_ROW                       00000008 R      01
PCS$MICRO_DATA                  0000024C R      01
PCS$MI_ERR                      00000955 R      01
PCS$M_BIT19                   = 00080000
PCS$M_BIT20                   = 00100000
PCS$M_DATA_ERR                = 00000002
PCS$M_EXP_CS_PAR              = 00000020
PCS$M_PAT                     = 00000001
PCS$M_REVERSE                 = 00000008
PCS$M_ROW_ERR                 = 00000004
PCS$NOISY_WORDS                 00000130 R      01
PCS$NO_LOAD_PCS                 0000031A R      06
PCS$NO_PARERR_MSG               00000996 R      01
PCS$PAR_ERR_WORD                000002B4 R      01
PCS$PCS_ERR                     0000097B R      01
PCS$PTH_INST                    0000029B R      06
PCS$RENTRY1                     000003EE R      03
PCS$RENTRY2                     00000151 R      06
PCS$RENTRY3                     000001FD R      06
PCS$RENTRY4                     0000029F R      06
PCS$RENTRY5                     000002BE R      06
PCS$RM_DECODE                   00000303 R      01
PCS$ROWERR                      000008AF R      01
PCS$SETUP_ADDR                  000003C4 R      01
PCS$TABLE1                      00000210 R      01
PCS$TAG1                        000002E5 R      03
PCS$TAG2                        0000040A R      03
PCS$TAG3                        0000010D R      06
PCS$TAG4                        0000017D R      06
PCS$TAG5                        000001B5 R      06
PCS$TAG6                        00000229 R      06
PCS$TAG7                        0000027F R      06
PCS$TAG8                        00000304 R      06
PCS$T_ADR_ERR                   0000076C R      01
PCS$T_CS_PARITY1                000004FF R      01
PCS$T_CS_PARITY2                00000532 R      01
PCS$T_CS_PARITY3                0000055E R      01
PCS$T_DATAPATH                  0000068B R      01
PCS$T_DPERR                     000006B1 R      01
PCS$T_ENTRY_ERR                 00000805 R      01
PCS$T_EXPECTED                  00000616 R      01
PCS$T_MC_ERR                    000005E5 R      01
PCS$T_MC_MESS                   00000592 R      01
PCS$T_MI_ERR1                   0000079A R      01
PCS$T_MI_ERR2                   000007D0 R      01
PCS$T_NO_PCS                    00000623 R      01
PCS$T_NXFIELD_ERR               0000082A R      01
PCS$T_PCS_ERR                   000005BB R      01
PCS$T_PCS_NORESPOND             0000064D R      01
PCS$T_ROW                       000006EA R      01
PCS$T_ROWERR                    00000711 R      01
PCS$V_BIT14                   = 0000000E
PCS$V_DATA_ERR                = 00000001
PCS$V_EXP_CS_PAR              = 00000005
PCS$V_PAT                     = 00000000
PCS$V_REVERSE                 = 00000003
PCS$V_ROW_ERR                 = 00000002
POWER_FAIL                    = 00000003  G
PR$_SID                         ********    X   03
PR750$_CADR                   = 00000025
PSL$K_EXEC                    = 00000001
PSL$K_KERNEL                  = 00000000
PSL$K_SUPER                   = 00000002
PSL$K_USER                    = 00000003
PSL$M_CBIT                    = 00000001
```

```
PSL$M_NBIT                      = 00000008
PSL$M_VBIT                      = 00000002
PSL$M_ZBIT                      = 00000004
PSL$V_CBIT                      = 00000000
PSL$V_NBIT                      = 00000003
PSL$V_VBIT                      = 00000001
PSL$V_ZBIT                      = 00000002
SCB$L_ACCESS                      00000020
SCB$L_ARITH                       00000034
SCB$L_BREAK                       0000002C
SCB$L_CHME                        00000044
SCB$L_CHMK                        00000040
SCB$L_CHMS                        00000048
SCB$L_CHMU                        0000004C
SCB$L_COMPAT                      00000030
SCB$L_KNLSTK                      00000008
SCB$L_MACHCHK                     00000004
SCB$L_OPCCUS                      00000014
SCB$L_OPCDEC                      00000010
SCB$L_POWER                       0000000C
SCB$L_RADRMOD                     0000001C
SCB$L_ROPRAND                     00000018
SCB$L_RXDB                        000000F8
SCB$L_SFTLVL1                     00000084
SCB$L_SFTLVL10                    000000A8
SCB$L_SFTLVL11                    000000AC
SCB$L_SFTLVL12                    000000B0
SCB$L_SFTLVL13                    000000B4
SCB$L_SFTLVL14                    000000B8
SCB$L_SFTLVL15                    000000BC
SCB$L_SFTLVL2                     00000088
SCB$L_SFTLVL3                     0000008C
SCB$L_SFTLVL4                     00000090
SCB$L_SFTLVL5                     00000094
SCB$L_SFTLVL6                     00000098
SCB$L_SFTLVL7                     0000009C
SCB$L_SFTLVL8                     000000A0
SCB$L_SFTLVL9                     000000A4
SCB$L_TBIT                        00000028
SCB$L_TIMER                       000000C0
SCB$L_TRANSL                      00000024
SCB$L_TXDB                        000000FC
SCB$L_WTBUSERR                  = 00000060
SCB$L_ZERO                        00000000
SEP_FUNCTIONAL                  = 00000002
SEP_REPAIR                      = 00000003
SIZ...                          = 00000001
SYS$ALLOC                         00010238
SYS$ASCTIM                        00010248
SYS$ASSIGN                        00010250
SYS$BINTIM                        00010258
SYS$CANCEL                        00010260
SYS$CANTIM                        00010268
SYS$CLOSE                         000105B8
SYS$CLREF                         00010298
SYS$CONNECT                       000105C0
SYS$DALLOC                        000102D8
SYS$DASSGN                        000102E0
SYS$DISCONNECT                    000105D0
SYS$FAO                           00010350
SYS$FAOL                          00010358
SYS$GET                           00010580
SYS$GETCHN                        000104C8
SYS$GETTIM                        00010378
SYS$LKWSET                        000103A0
SYS$NUMTIM                        000103B8
SYS$OPEN                          00010608
SYS$QIO                           000103C8
SYS$QIOW                          00010200
SYS$READ                          00010590
SYS$READEF                        000103D0
SYS$SETAST                        000103F8
SYS$SETEF                         00010400
SYS$SETIMR                        00010420
SYS$SETPRI                        00010428
SYS$SETPRT                        00010430
SYS$SETRWM                        00010438
SYS$SETSWM                        00010448
SYS$ULKPAG                        00010460
SYS$ULWSET                        00010468
SYS$UNWIND                        00010470
SYS$WAITFR                        00010478
SYS$WFLAND                        00010488
SYS$WFLOR                         00010490
T13_S1                            000000DF RG     03
T13_S1_X                          00000177 R      03
T13_S2                            00000182 RG     03
T13_S2_X                          00000215 R      03
T13_S3                            00000220 RG     03
T13_S3_X                          000002B3 R      03
T13_S4                            000002BE RG     03
T13_S4_X                          00000417 R      03
T14_S1                            000000EB RG     06
T14_S1_X                          00000183 R      06
T14_S2                            0000018E RG     06
T14_S2_X                          0000022F R      06
T14_S3                            0000023A RG     06
T14_S3_X                          0000031A R      06
TEST_013                          00000018 RG     03
TEST_013_X                        00000425 RG     03
TEST_014                          0000001C RG     06
TEST_014_X                        00000328 RG     06
TU58                            = 00000002  G
WCS                             = 00000007  G
```

Psect synopsis

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
ECKAXH	000009DF (2527.)	01 (1.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
ABS	00010610 (67088.)	02 (2.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE
TEST_013	0000042D (1069.)	03 (3.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
DISPATCH	00000030 (48.)	04 (4.)	NOPIC USR CON REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG
ARGLIST	00000054 (84.)	05 (5.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC LONG
TEST_014	00000330 (816.)	06 (6.)	NOPIC USR CON REL LCL NOSHR EXE RD NOWRT NOVEC PAGE
$TSTCNT	00000004 (4.)	07 (7.)	NOPIC USR OVR REL LCL NOSHR NOEXE RD NOWRT NOVEC LONG

Symbol Cross Reference

SYMBOL	VALUE	DEFINITION	REFERENCES...
$$$	=00000048-R	1251 (16)	1125 (14) 1188 (15) 1251 (16) 742 (9) 815 (10) 886 (11) 982 (12)
$$ARGS	=0000000A	83 (2)	83 (2)
$$E	=00000003	1251 (16)	1046 (12) 1152 (14) 1215 (15) 1300 (16) 771 (9) 844 (10) 915 (11)
$$M	=00000006	1289 (16)	1004 (12) 1011 (12) 1042 (12) 1061 (13) 1071 (13) 1083 (13) 1143 (14) 1147 (14) 1206 (15) 1210 (15) 1289 (16) 657 (8) 667 (8) 679 (8) 757 (9) 841 (10) 910 (11)
$$N	=00000001	1289 (16)	1004 (12) 1011 (12) 1042 (12) 1071 (13) #-1074 (13) 1083 (13) #-1087 (13) 1143 (14) 1147 (14) 1206 (15) 1210 (15) 1289 (16) 577 (7) #-582 (7) 588 (7) 590 (7) #-598 (7) 606 (7) 608 (7) 620 (7) 627 (7) #-632 (7) #-633 (7) #-634 (7) #-638 (7) 667 (8) #-670 (8) 679 (8) #-683 (8) 757 (9) 841 (10) 87 (2) 910 (11)
$$S	=FFFFFFFF	1302 (16)	1052 (13) 1061 (13) 1096 (14) 1125 (14) 1158 (15) 1188 (15) 1218 (16) 1251 (16) 645 (8) 657 (8) 692 (9) 742 (9) 775 (10) 815 (10) 848 (11) 886 (11) 919 (12) 982 (12)
$$T1	=0000002C	83 (2)	83 (2)
$ENV	=00000001	66 (2)	
$ER	=FFFFFFFF	1302 (16)	#-1004 (12) #-1011 (12) #-1042 (12) #-1071 (13) #-1083 (13) 1125 (14) #-1143 (14) #-1147 (14) 1188 (15) #-1206 (15) #-1210 (15) 1251 (16) #-1289 (16) #-667 (8) #-679 (8) 742 (9) #-757 (9) 815 (10) #-841 (10) 886 (11) #-910 (11) 982 (12)
$MO	=00000001	1304 (16)	1304 (16)
S	=00000048-R	1251 (16)	1046 (12) 1125 (14) 1152 (14) 1188 (15) 1215 (15) 1251 (16) 1300 (16) 742 (9) 771 (9) 815 (10) 844 (10) 886 (11) 915 (11) 982 (12)
$ST	=00000000	1302 (16)	1004 (12) 1011 (12) 1042 (12) 1043 (12) 1046 (12) 1048 (12) 1061 (13) 1071 (13) 1083 (13) 1096 (14) 1125 (14) 1143 (14) 1147 (14) 1149 (14) 1152 (14) 1158 (15) 1188 (15) 1206 (15) 1210 (15) 1212 (15) 1215 (15) 1218 (16) 1251 (16) 1289 (16) 1300 (16) 1302 (16) 657 (8) 667 (8) 679 (8) 687 (8) 692 (9) 742 (9) 757 (9) 758 (9) 771 (9) 775 (10) 815 (10) 841 (10) 844 (10) 848 (11) 886 (11) 910 (11) 915 (11) 919 (12)

```
                                                        982     (12)
$TN                             =0000000E       1304    (16)    1004    (12)    1011    (12)    1042    (12)    1048    (12)
                                                        1052    (13)    1061    (13)    1071    (13)    1073    (13)
                                                        1075    (13)    1083    (13)    1086    (13)    1088    (13)
                                                        1096    (14)    1143    (14)    1147    (14)    1158    (15)
                                                        1206    (15)    1210    (15)    1218    (16)    1289    (16)
                                                        1302    (16)    1304    (16)    645     (8)     657     (8)
                                                        667     (8)     669     (8)     671     (8)     679     (8)
                                                        682     (8)     684     (8)     692     (9)     757     (9)
                                                        775     (10)    841     (10)    848     (11)    910     (11)
                                                        919     (12)
ALL                             =00000009       87      (2)     1061    (13)    657     (8)
A_MCHK_BUFFER                    00000000-XR                    #-487   (3)     #-635   (7)
BASE_013                         00000000-R     645     (8)     657     (8)
BASE_014                         00000000-R     1052    (13)    1061    (13)
BIT...                          =0000001A       82      (2)     66      (2)     80      (2)     81      (2)     82      (2)
CEP_FUNCTIONAL                  =00000000       66      (2)
CEP_REPAIR                      =00000001       66      (2)     66      (2)
DATA_013                         00000014-R     657     (8)     657     (8)
DATA_014                         00000018-R     1061    (13)    1061    (13)
DEFAULT                         =00000000       87      (2)     1061    (13)    657     (8)
DS$ABORT                         00010020                       1291    (16)    476     (3)
DS$BGNSUB                        00010030                       1125    (14)    1188    (15)    1251    (16)    742     (9)
                                                        815     (10)    886     (11)    982     (12)
DS$BREAK                         00010058                       1012    (12)    1048    (12)    1302    (16)
DS$CKLOOP                        00010040                       1043    (12)    1149    (14)    1212    (15)    687     (8)
                                                        758     (9)
DS$CLRVEC                        00010168                       1045    (12)    1280    (16)    1281    (16)    1286    (16)
                                                        1287    (16)
DS$ENDSUB                        00010038                       1046    (12)    1152    (14)    1215    (15)    1300    (16)
                                                        771     (9)     844     (10)    915     (11)
DS$ERRHARD                       000100D0                       1004    (12)    1011    (12)    1042    (12)    1071    (13)
                                                        1083    (13)    1143    (14)    1147    (14)    1206    (15)
                                                        1210    (15)    1289    (16)    667     (8)     679     (8)
                                                        757     (9)     841     (10)    910     (11)
DS$K_ERROR                      =00000002       80      (2)
DS$K_NORMAL                     =00000001       80      (2)
DS$K_SEVERE                     =00000004       80      (2)
DS$K_SUBSYS                     =00000066       80      (2)     80      (2)
DS$K_WARNING                    =00000000       80      (2)
DS$LOADPCS                       000101C0                       1297    (16)
DS$PRINTB                        000100E0                       577     (7)     582     (7)     588     (7)     598     (7)
                                                        606     (7)     620     (7)     627     (7)     632     (7)
                                                        633     (7)     634     (7)     638     (7)
DS$PRINTF                        000100F0                       1074    (13)    1087    (13)    670     (8)     683     (8)
DS$PRINTSIG                      00010100                       475     (3)     637     (7)     639     (7)
DS$PRINTX                        000100E8                       590     (7)     608     (7)
DS$PROBE                         000101A0                       1077    (13)    673     (8)
DS$SETVEC                        00010160                       1090    (13)    1254    (16)    984     (12)
DS$_ARITH                       =006600D0       80      (2)
DS$_ASBE                        =00660118       80      (2)
DS$_BADLINK                     =006600F0       80      (2)
DS$_BADTYPE                     =006600E8       80      (2)
DS$_BIIC                        =00660120       80      (2)
DS$_CHME                        =006600A8       80      (2)
```

```
DS$_CHMK                =006600E0      80      (2)
DS$_DEVNAME             =00660108      80      (2)
DS$_ERROR               =00660002      80      (2)
DS$_FHWE                =00660068      80      (2)
DS$_FRAGBUF             =00660080      80      (2)
DS$_ICBUSY              =006600C8      80      (2)
DS$_ICERR               =006600C0      80      (2)
DS$_IHWE                =00660060      80      (2)
DS$_ILLCHAR             =00660018      80      (2)
DS$_ILLPAGCNT           =00660078      80      (2)
DS$_ILLUNIT             =00660100      80      (2)
DS$_INSFMEM             =00660050      80      (2)
DS$_IPL2HI              =006600B8      80      (2)
DS$_IVADDR              =00660040      80      (2)
DS$_IVVECT              =00660038      80      (2)
DS$_KRNLSTK             =00660090      80      (2)
DS$_LOGIC               =00660070      80      (2)
DS$_MCHK                =00660088      80      (2)      172     (2)     #-474     (3)
DS$_MMOFF               =00660058      80      (2)
DS$_NEEDUNIT            =006600F8      80      (2)
DS$_NODE                =00660128      80      (2)
DS$_NOPCS               =00660110      80      (2)
DS$_NORMAL              =00660001      80      (2)
DS$_NOSUPPORT           =006600B1      80      (2)
DS$_NOTDON              =00660030      80      (2)
DS$_NOTIMP              =006600B0      80      (2)      80      (2)
DS$_NULLSTR             =00660010      80      (2)
DS$_OVERFLOW            =00660008      80      (2)
DS$_POWER               =00660098      80      (2)
DS$_PROGERR             =00660020      80      (2)
DS$_SEVERE              =00660004      80      (2)
DS$_TRANSL              =006600A0      80      (2)
DS$_TRUNCATE            =00660028      80      (2)
DS$_UNEXPINT            =006600D8      80      (2)
DS$_VASFULL             =00660048      80      (2)
DS$_WARNING             =00660000      80      (2)      80      (2)
DSA$GL_FLAGS             0000FE00                       #-1069  (13)    #-1081  (13)    #-665   (8)     #-677   (8)
DSA$GL_PASSES            0000FE08                       #-1294  (16)
DSA$GL_PASSNO            0000FE54                       #-1066  (13)    #-1079  (13)    #-662   (8)     #-675   (8)
DSA$M_APT               =80000000                       #-1069  (13)    #-1081  (13)    #-665   (8)     #-677   (8)
ENV$M_DOMAIN            =00000002      66      (2)
ENV$M_LEVEL             =00000001      66      (2)
ENV$M_SUPER             =000003FC      66      (2)
ENV$S_DOMAIN            =00000001      66      (2)
ENV$S_LEVEL             =00000001      66      (2)
ENV$S_SUPER             =00000008      66      (2)
ENV$V_DOMAIN            =00000001      66      (2)      66      (2)
ENV$V_LEVEL             =00000000      66      (2)      66      (2)
ENV$V_SUPER             =00000002      66      (2)
ENV$_CPU                =00000000      66      (2)      66      (2)
ENV$_FUNCTIONAL         =00000000      66      (2)      66      (2)
ENV$_REPAIR             =00000001      66      (2)      66      (2)
ENV$_SUPER              =00000001      66      (2)
ENV$_SYSTEM             =00000001      66      (2)      66      (2)
ERR$_MSGADR             =0000000C      83      (2)
```

```
ERR$_NARGS                      =0000000A     83      (2)
ERR$_NUM                        =00000004     83      (2)
ERR$_P1                         =00000014     83      (2)     #-577   (7)     #-600   (7)     #-616   (7)      633    (7)
ERR$_P2                         =00000018     83      (2)       574   (7)     #-617   (7)       639   (7)
ERR$_P3                         =0000001C     83      (2)     #-575   (7)     #-577   (7)     #-618   (7)
ERR$_P4                         =00000020     83      (2)
ERR$_P5                         =00000024     83      (2)
ERR$_P6                         =00000028     83      (2)
ERR$_POINTER                    =00000010     83      (2)
ERR$_UNIT                       =00000008     83      (2)
HALT                            =00000004     87      (2)
IPR                             =00000006     87      (2)
L_REV_CHECK                      00000000-XR                  #-1064  (13)    #-660   (8)
MANUAL                          =00000001     87      (2)
MCHK                            =00000005     87      (2)
MSG_013                          00000002-R   645     (8)       657   (8)
MSG_014                          00000002-R   1052    (13)      1061  (13)
PAR$M_ATDEF                     =00000010     81      (2)
PAR$M_ATHI                      =00000008     81      (2)
PAR$M_ATLO                      =00000004     81      (2)
PAR$M_NODEF                     =00000002     81      (2)
PAR$V_ATDEF                     =00000004     81      (2)
PAR$V_ATHI                      =00000003     81      (2)
PAR$V_ATLO                      =00000002     81      (2)
PAR$V_NODEF                     =00000001     81      (2)
PAR$_BIN                        =00000002     81      (2)
PAR$_DEC                        =0000000A     81      (2)
PAR$_HEX                        =00000010     81      (2)
PAR$_NO                         =00000000     81      (2)
PAR$_OCT                        =00000008     81      (2)
PAR$_YES                        =00000001     81      (2)
PCS                             =00000008     87      (2)     1061    (13)      657   (8)
PCS$ADDR_ERR                     000008FF-R   596     (7)       910   (11)
PCS$A_ENA_ADDRESS                0000001C-R   120     (2)   #-1131    (14)    #-1134  (14)    #-1194  (15)    #-1197  (15)
                                                             #-1264    (16)    #-1267  (16)    #-283   (3)     #-288   (3)
                                                             #-393     (3)     #-745   (9)     #-889   (11)
PCS$A_PCS_ADDRESS                00000018-R   117     (2)   #-1076    (13)    #-1140  (14)    #-1146  (14)    #-1203  (15)
                                                             #-1209    (15)    #-1278  (16)    #-1284  (16)    #-287   (3)
                                                             #-367     (3)     #-395   (3)     #-446   (3)     #-449   (3)
                                                             #-451     (3)     #-584   (7)     #-672   (8)     #-744   (9)
                                                             #-818     (10)    #-819   (10)    #-824   (10)    #-890   (11)
PCS$A_PCS_BUF                    00000030-R   133     (2)       271   (3)       585   (7)       826   (10)      833   (10)
PCS$A_PCS_BUFFER                 00000000-XR                  #-365   (3)     #-997   (12)
PCS$A_PTHBIT_ADDRESS             00000024-R   126     (2)   #-282     (3)
PCS$A_PTH_LOCATION               00000020-R   123     (2)   #-1132    (14)    #-1195  (15)    #-1265  (16)
PCS$A_RETURN                     0000000C-R   96      (2)   #-1128    (14)    #-1191  (15)      1258  (16)    #-481   (3)
                                                             #-493     (3)     #-983   (12)
PCS$CHECK_MCHK                   000004B8-R   467     (3)       1090  (13)      1254  (16)      984   (12)
PCS$CLEAR_BUFFER                 000002B8-R   270     (3)       817   (10)
PCS$CLEAR_PCS                    000002CE-R   281     (3)       1091  (13)      1148  (14)      1151  (14)      1211  (15)
                                                               1214  (15)      1293  (16)      689   (8)       770   (9)
                                                               843   (10)      913   (11)
PCS$CODEVECTORS                  000001B0-R   141     (2)   #-342     (3)
PCS$CODE_WORDS                   000001C0-R   147     (2)       893   (11)
PCS$DATA_PATTERN                 00000028-R   129     (2)   #-747     (9)     #-764   (9)
```

```
PCS$DATA_TABLE                  000001EC-R   159   (2)      990   (12)      991   (12)
PCS$DECODED_WORDS               000000B0-R   135   (2)   #-302    (3)      332    (3)   #-340    (3)      352    (3)
                                                           602    (7)      902   (11)
PCS$DPERR                       0000088C-R   572   (7)      757    (9)
PCS$F_PCS_ERR                   00000858-R   562   (5)      627    (7)
PCS$F_ROWERR1                   0000073C-R   541   (5)      588    (7)      606    (7)
PCS$F_ROWERR2                   00000757-R   544   (5)      590    (7)      608    (7)
PCS$LOAD_MICRO                  000003FC-R   392   (3)     1135   (14)     1198   (15)     1268   (16)
PCS$L_COUNT                     00000000-R    93   (2)   #-1127   (14)   #-1190   (15)   #-1253   (16)   #-272    (3)
                                                         #-274    (3)   #-284    (3)   #-286    (3)   #-289    (3)
                                                         #-291    (3)   #-402    (3)   #-439    (3)
PCS$L_FLAGS                     00000014-R    98   (2)     1013   (12)     1026   (12)   #-1028   (12)   #-1126   (14)
                                                         #-1189   (15)   #-1252   (16)   #-1255   (16)    443    (3)
                                                          470    (3)   #-743    (9)      762    (9)   #-765    (9)
                                                         #-768    (9)   #-816   (10)   #-836   (10)    839   (10)
                                                         #-887   (11)   #-905   (11)    908   (11)   #-986   (12)
                                                          992   (12)
PCS$L_INC                       00000004-R    94   (2)   #-1031   (12)     1032   (12)   #-364    (3)   #-988   (12)
PCS$L_ROW                       00000008-R    95   (2)   #-1035   (12)   #-1037   (12)   #-368    (3)   #-987   (12)
PCS$MICRO_DATA                  0000024C-R   202   (2)      396    (3)
PCS$MI_ERR                      00000955-R   614   (7)     1004   (12)     1011   (12)
PCS$M_BIT19                    =00080000     114   (2)   #-427    (3)
PCS$M_BIT20                    =00100000     115   (2)   #-446    (3)   #-451    (3)
PCS$M_DATA_ERR                 =00000002     103   (2)   #-905   (11)
PCS$M_EXP_CS_PAR               =00000020     109   (2)  #-1255   (16)
PCS$M_PAT                      =00000001     101   (2)   #-765    (9)   #-768    (9)
PCS$M_REVERSE                  =00000008     107   (2)  #-1028   (12)
PCS$M_ROW_ERR                  =00000004     105   (2)   #-836   (10)
PCS$NOISY_WORDS                 00000130-R   138   (2)   #-310    (3)   #-338    (3)      894   (11)
PCS$NO_LOAD_PCS                 0000031A-R  1299  (16)  #-1295   (16)
PCS$NO_PARERR_MSG               00000996-R   630   (7)     1289   (16)
PCS$PAR_ERR_WORD                000002B4-R   250   (2)   #-450    (3)
PCS$PCS_ERR                     0000097B-R   623   (7)     1143   (14)     1206   (15)
PCS$PTH_INST                    0000029B-R  1269  (16)      176    (2)      184    (2)
PCS$RENTRY1                     000003EE-R  1041  (12)      983   (12)
PCS$RENTRY2                     00000151-R  1145  (14)     1128   (14)
PCS$RENTRY3                     000001FD-R  1208  (15)     1191   (15)
PCS$RENTRY4                     0000029F-R  1277  (16)     1259   (16)
PCS$RENTRY5                     000002BE-R  1283  (16)     1261   (16)   #-1274   (16)
PCS$RM_DECODE                   00000303-R   298   (3)      900   (11)
PCS$ROWERR                      000008AF-R   580   (7)      841   (10)
PCS$SETUP_ADDR                  000003C4-R   363   (3)      989   (12)
PCS$TABLEI                      00000210-R   170   (2)   #-1289   (16)   #-636    (7)
PCS$TAG1                        000002E5-R   985  (12)     1043   (12)
PCS$TAG2                        0000040A-R  1044  (12)   #-1040   (12)
PCS$TAG3                        0000010D-R  1129  (14)     1149   (14)
PCS$TAG4                        0000017D-R  1150  (14)   #-1142   (14)   #-1144   (14)
PCS$TAG5                        000001B5-R  1192  (15)     1212   (15)
PCS$TAG6                        00000229-R  1213  (15)   #-1205   (15)   #-1207   (15)
PCS$TAG7                        0000027F-R  1263  (16)
PCS$TAG8                        00000304-R  1292  (16)   #-1282   (16)   #-1290   (16)
PCS$T_ADR_ERR                   0000076C-R   547   (5)      910   (11)
PCS$T_CS_PARITY1                000004FF-R   501   (5)     1042   (12)
PCS$T_CS_PARITY2                00000532-R   504   (5)     1147   (14)
PCS$T_CS_PARITY3                0000055E-R   507   (5)     1210   (15)
```

```
PCS$T_DATAPATH                  0000068B-R  529   (5)      757   (9)
PCS$T_DPERR                     000006B1-R  532   (5)      577   (7)      620   (7)
PCS$T_ENTRY_ERR                 00000805-R  556   (5)     1143   (14)
PCS$T_EXPECTED                  00000616-R  520   (5)      638   (7)
PCS$T_MC_ERR                    000005E5-R  516   (5)      634   (7)
PCS$T_MC_MESS                   00000592-R  510   (5)      632   (7)
PCS$T_MI_ERR1                   0000079A-R  550   (5)     1004   (12)
PCS$T_MI_ERR2                   000007D0-R  553   (5)     1011   (12)
PCS$T_NO_PCS                    00000623-R  523   (5)     1071   (13)     1074   (13)     667   (8)     670   (8)
PCS$T_NXFIELD_ERR               0000082A-R  559   (5)     1206   (15)
PCS$T_PCS_ERR                   000005BB-R  513   (5)   #-1289   (16)
PCS$T_PCS_NORESPOND             0000064D-R  526   (5)     1083   (13)     1087   (13)     679   (8)     683   (8)
PCS$T_ROW                       000006EA-R  535   (5)      841   (10)
PCS$T_ROWERR                    00000711-R  538   (5)      582   (7)      598   (7)
PCS$V_BIT14                    =0000000E    113   (2)   #-1032   (12)   #-371   (3)    #-899   (11)
PCS$V_DATA_ERR                 =00000001    102   (2)   #-908    (11)
PCS$V_EXP_CS_PAR               =00000005    108   (2)   #-443    (3)    #-470   (3)
PCS$V_PAT                      =00000000    100   (2)   #-762    (9)
PCS$V_REVERSE                  =00000003    106   (2)   #-1013   (12)   #-1026  (12)   #-992   (12)
PCS$V_ROW_ERR                  =00000002    104   (2)   #-839    (10)
POWER_FAIL                     =00000003    87    (2)
PR$_SID                         00000000-XR             #-1062   (13)   #-658   (8)
PR750$_CADR                    =00000025                #-1089   (13)   #-686   (8)
PSL$K_EXEC                     =00000001    82    (2)
PSL$K_KERNEL                   =00000000    82    (2)
PSL$K_SUPER                    =00000002    82    (2)
PSL$K_USER                     =00000003    82    (2)
PSL$M_CBIT                     =00000001    82    (2)
PSL$M_NBIT                     =00000008    82    (2)
PSL$M_VBIT                     =00000002    82    (2)
PSL$M_ZBIT                     =00000004    82    (2)
PSL$V_CBIT                     =00000000    82    (2)
PSL$V_NBIT                     =00000003    82    (2)
PSL$V_VBIT                     =00000001    82    (2)
PSL$V_ZBIT                     =00000002    82    (2)
SCB$L_MACHCHK                   00000004                #-1045   (12)   #-1090  (13)   #-1254  (16)   #-1280  (16)
                                                        #-1286   (16)   #-984   (12)
SCB$L_OPCCUS                    00000014                #-1281   (16)   #-1287  (16)
SCB$L_WTBUSERR                 =00000060    112   (2)
SEP_FUNCTIONAL                 =00000002    66    (2)
SEP_REPAIR                     =00000003    66    (2)
SIZ...                         =00000001    82    (2)      66   (2)      81   (2)      82   (2)
T13_S1                          000000DF-R  742   (9)
T13_S1_X                        00000177-R  771   (9)
T13_S2                          00000182-R  815   (10)
T13_S2_X                        00000215-R  844   (10)
T13_S3                          00000220-R  886   (11)
T13_S3_X                        000002B3-R  915   (11)
T13_S4                          000002BE-R  982   (12)
T13_S4_X                        00000417-R  1046  (12)
T14_S1                          000000EB-R  1125  (14)
T14_S1_X                        00000183-R  1152  (14)
T14_S2                          0000018E-R  1188  (15)
T14_S2_X                        0000022F-R  1215  (15)
T14_S3                          0000023A-R  1251  (16)
```

```
T14_S3_X                        0000031A-R   1300   (16)
TEST_013                        00000018-R   657    (8)      657    (8)
TEST_013_X                      00000425-R   1048   (12)   #-669    (8)    #-671    (8)    #-682    (8)    #-684    (8)
TEST_014                        0000001C-R   1061   (13)    1061    (13)
TEST_014_X                      00000328-R   1302   (16)   #-1073   (13)   #-1075   (13)   #-1086   (13)   #-1088   (13)
TU58                           =00000002     87     (2)
WCS                            =00000007     87     (2)
```

Macros Cross Reference

MACRO	SIZE	DEFINITION	REFERENCES...
$D1_ABPROGRAM	1	476 (3)	1291 (16) 476 (3)
$D1_BSUBT	1	742 (9)	1125 (14) 1188 (15) 1251 (16) 742 (9) 815 (10) 886 (11) 982 (12)
$D1_BTEST	1	657 (8)	1061 (13) 657 (8)
$D1_ERR	1	667 (8)	1004 (12) 1011 (12) 1042 (12) 1071 (13) 1083 (13) 1143 (14) 1147 (14) 1206 (15) 1210 (15) 1289 (16) 667 (8) 679 (8) 757 (9) 841 (10) 910 (11)
$D1_ERR_S	1	667 (8)	1004 (12) 1011 (12) 1042 (12) 1071 (13) 1083 (13) 1143 (14) 1147 (14) 1206 (15) 1210 (15) 1289 (16) 667 (8) 679 (8) 757 (9) 841 (10) 910 (11)
$D1_ESUBT	1	771 (9)	1046 (12) 1152 (14) 1215 (15) 1300 (16) 771 (9) 844 (10) 915 (11)
$D1_ETEST	1	1048 (12)	1048 (12) 1302 (16)
$D1_EXTEST	1	669 (8)	1073 (13) 1075 (13) 1086 (13) 1088 (13) 669 (8) 671 (8) 682 (8) 684 (8)
$D1_PRINT_S	1	577 (7)	1074 (13) 1087 (13) 577 (7) 582 (7) 588 (7) 590 (7) 598 (7) 606 (7) 608 (7) 620 (7) 627 (7) 632 (7) 633 (7) 634 (7) 638 (7) 670 (8) 683 (8)
$D1_SBTTL	2	645 (8)	1052 (13) 1096 (14) 1158 (15) 1218 (16) 645 (8) 692 (9) 775 (10) 848 (11) 919 (12)
$D2_BDATA	1	657 (8)	1061 (13) 657 (8)
$D2_BTEST	1	657 (8)	1061 (13) 657 (8)
$D2_SBTTL	1	645 (8)	1052 (13) 645 (8)
$DEF	1	82 (2)	
$DEFINI	1	78 (2)	78 (2) 79 (2) 82 (2) 84 (2) 85 (2) 86 (2) 88 (2)
$DS_ABORT	1	476 (3)	1291 (16) 476 (3)
$DS_BCOMPLETE	1	1290 (16)	1290 (16)
$DS_BGNMESSAGE	1	573 (7)	573 (7) 581 (7) 597 (7) 615 (7) 624 (7) 631 (7)
$DS_BGNMOD	1	66 (2)	66 (2)
$DS_BGNSUB	1	742 (9)	1125 (14) 1188 (15) 1251 (16) 742 (9) 815 (10) 886 (11) 982 (12)
$DS_BGNTEST	1	657 (8)	1061 (13) 657 (8)
$DS_BREAK	1	1012 (12)	1012 (12) 1048 (12) 1302 (16)
$DS_CKLOOP	1	687 (8)	1043 (12) 1149 (14) 1212 (15) 687 (8) 758 (9)
$DS_CLRVEC_S	1	1045 (12)	1045 (12) 1280 (16) 1281 (16) 1286 (16) 1287 (16)
$DS_DSADEF	5	79 (2)	79 (2)
$DS_DSDEF	2	80 (2)	80 (2)
$DS_DSSDEF	8	84 (2)	84 (2)
$DS_ENDDATA	1	657 (8)	1061 (13) 657 (8)
$DS_ENDMESSAGE	1	578 (7)	578 (7) 594 (7) 612 (7) 621 (7) 628 (7) 640 (7)
$DS_ENDMOD	1	1304 (16)	1304 (16)
$DS_ENDSUB	1	771 (9)	1046 (12) 1152 (14) 1215 (15) 1300 (16) 771 (9) 844 (10) 915 (11)
$DS_ENDTEST	1	1048 (12)	1048 (12) 1302 (16)

```
$DS_ENVDEF          2          66      (2)       66      (2)
$DS_ERRDEF          1          83      (2)       83      (2)
$DS_ERRHARD_S       1         667      (8)     1003     (12)     1010     (12)     1042     (12)     1071     (13)     1083     (13)
                                               1143     (14)     1147     (14)     1206     (15)     1210     (15)     1288     (16)
                                                667      (8)      679      (8)      756      (9)      841     (10)      910     (11)
$DS_EXIT            1         669      (8)     1073     (13)     1075     (13)     1086     (13)     1088     (13)      669      (8)
                                                671      (8)      682      (8)      684      (8)
$DS_HPODEF          2          85      (2)       85      (2)
$DS_KA_DEF          3          86      (2)       86      (2)
$DS_LOADPCS_S       1        1297     (16)     1297     (16)
$DS_PAGE            1         643      (7)     1050     (12)     1092     (13)     1154     (14)      643      (7)      690      (8)
                                                773      (9)      846     (10)      917     (11)
$DS_PARDEF          1          81      (2)       81      (2)
$DS_PRINTB_S        1         576      (7)      576      (7)      582      (7)      588      (7)      598      (7)      606      (7)
                                                620      (7)      627      (7)      632      (7)      633      (7)      634      (7)
                                                638      (7)
$DS_PRINTF_S        1         670      (8)     1074     (13)     1087     (13)      670      (8)      683      (8)
$DS_PRINTSIG_G      1         475      (3)      475      (3)      637      (7)      639      (7)
$DS_PRINTX_S        1         590      (7)      590      (7)      608      (7)
$DS_PROBE_S         1         673      (8)     1077     (13)      673      (8)
$DS_PSLDEF          1          82      (2)       82      (2)
$DS_SBTTL           1         645      (8)     1052     (13)     1096     (14)     1158     (15)     1218     (16)      645      (8)
                                                692      (9)      775     (10)      848     (11)      919     (12)
$DS_SCBDEF          3          78      (2)       78      (2)
$DS_SECDEF          1          87      (2)       87      (2)
$DS_SETVEC_S        1         984     (12)     1090     (13)     1254     (16)      984     (12)
$EQU                1          82      (2)       66      (2)       80      (2)       81      (2)       82      (2)
$EQULS1             1          82      (2)       66      (2)       80      (2)       82      (2)
$EQULST             1          66      (2)       66      (2)       80      (2)       82      (2)
$GBLINI             2          66      (2)       66      (2)       80      (2)       81      (2)       82      (2)
$OFFDEF             1          83      (2)       83      (2)
$PR750DEF           1          88      (2)       88      (2)
$PSLDEF             2          82      (2)       82      (2)
$PUSHADR            1         667      (8)     1004     (12)     1011     (12)     1042     (12)     1071     (13)     1083     (13)
                                               1143     (14)     1147     (14)     1206     (15)     1210     (15)     1289     (16)
                                                667      (8)      679      (8)      757      (9)      841     (10)      910     (11)
$VIELD              1          66      (2)       66      (2)       81      (2)       82      (2)
$VIELD1             1          82      (2)       66      (2)       81      (2)       82      (2)
ECKAX_SECDEF        1          87      (2)       87      (2)
```

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	47	00:00:00.12	00:00:00.60
Command processing	912	00:00:00.74	00:00:01.51
Pass 1	1298	00:00:13.67	00:00:19.99
Symbol table sort	0	00:00:00.58	00:00:00.58
Pass 2	116	00:00:03.54	00:00:04.76
Symbol table output	38	00:00:00.24	00:00:00.65
Psect synopsis output	2	00:00:00.03	00:00:00.03
Cross-reference output	6	00:00:01.20	00:00:01.39
Assembler run totals	2421	00:00:20.12	00:00:29.51

```
The working set limit was 3212 pages.
201200 bytes (393 pages) of virtual memory were used to buffer the intermediate code.
There were 30 pages of symbol table space allocated to hold 550 non-local and 83 local symbols.
1305 source lines were read in Pass 1, producing 34 object records in Pass 2.
132 pages of virtual memory were used to define 59 macros.
```

+----------------------------+
! Macro library statistics !
+----------------------------+

Macro library name	Macros defined
DISK$DIAGPACK02:[TAYLOR.ECKAX]ECKAX.MLB;1	1
SYS$COMMON:[SYSLIB]DIAG.MLB;955	49
SYS$COMMON:[SYSLIB]STARLET.MLB;2	9
TOTALS (all libraries)	59

```
903 GETS were required to define 59 macros.

There were no errors, warnings or information messages.

MACRO/LIS=ECKAX8.LIS/CROSS ECKAX8
```